POWER
SUPPLIES
&
AMPLIFIERS

Vintage Radio Identification SKETCH-BOOKS of D. H. MOORE

VOLUME IV

The Editorial Group, Ltd...

P.O. BOX 521 • PALO ALTO, CALIFORNIA

PUBLISHING HISTORY

First Edition: © D.H.MOORE, 1954.
2nd Printing: © D.G.YULE, 1985

Second Edition: © D.G.YULE, 1986.

Third Edition: © RAY FOSTER, 1987
2nd Printing: © RAY FOSTER, 1987

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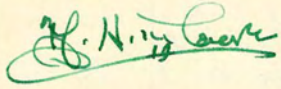
Library of Congress Catalogue Card: 87-98347

DEDICATION

.....to a way of life
that should not have
been forgotten.



Acknowledgements

Bits and pieces of these volumes have been published, referenced, reviewed in several media devoted to the hobby of vintage Radio, including a few foreign countries, such as New Zealand, Japan, Canada and England. Such favourable notice for such a labour of love is hereby acknowledged in appreciation.

Thanks must also be offered Stan Lopes who tediously editted the technical authenticity of circuitry to be found in Volumes II through VII. His labours have resulted in an obvious authenticity, we feel, especially for those who delight in tracing out vintage schematics. He even found technical errors in original sources!

Special thanks are due Douglas G. Yule, who originally sponsored this effort as a contribution to the hobby, without whose prompting these Sketch-Books may not have come into existence. Also, thanks are given to Howard W. Granoff, of the OLDE TYME RADIO COMPANY, whose unflagging enthusiasm and publicity has done much to make these Sketch-Books known within the fraternity.

And in as much as fraternalism is the basis for shared enthusiasm, which is what any hobby is, and because of the original and dramatic shift away from the current vintage Radio fare, it follows that the publishers and the author, being human, would appreciate hearing from you, your comments, along with any suggestions you'd care to offer with an eye to producing bigger and better vintage Radio literature in future.

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NOTE

Seperate MONOGRAPHS have been prepared for the following marques:

Bremer-Tully	Remler/Infradyne
Pilot	Victoreen
Hammarlund/Nat'l.	Scott (Early)
'Ultradyne'	S-M (Early)

containing additional data.

INTRODUCTION

The evolution of battery eliminators for all primary voltage was rather erratic, and sometimes adventuresome for some manufacturers - not to mention set-constructors. The connecting of grid-and-plate of the early tubes to make them function as rectifiers was the most widely used practice, until the advent of the gaseous tube by Raytheon.

Others quickly sought to capitalise on the gaseous rectifier including such as Q-S-R, AmRad, Majestic, Donle, Magnatron, Ce-Co, among others, but Raytheon seems to have had the edge, in as much as their "B" and "B-H", as well as their"A" tubes proved to be more dependable.

There were two bug-bears inherent in many of the early B-eliminators which should be mentioned, in case you have a few laying about and would like to use them, or tear them down. These were the foil-type condensers used by many manufacturers; and the units utilising the autoformer type of power transformers. The latter proved rather dangerous in the hands of the inexpert, and media of the time would occasionally make reference to a set-constructor who was electrocuted by one.

The reason for using autoformers was quite simple - it was a very cheap way to save on transformer windings. That such windings also limited the amount of current that could be safely passed was ignored by advertisers of such battery eliminators.

It has been my experience, in the construction of literally dozens of the early eliminators detailed herein, that unless you are one of the "purists" anent vintage Radio as a hobby, replacing early power-condensers with modern canned electrolytics works well, and actually can give better results from any circuit. When I have encountered the types using autoformers, I've simply replaced them with conventional types.

There were many not-too-ingenious schemes put forward in the Twenties for single unit power supplies which would supply a variety, if not all, of voltages then required. Some were more successful than other attempts, and the great problem was always excessive hum. There was much printer's ink spilled in the pages of our magazines on this problem, but hum-elimination had to await advances in the state-of-the-art of several components peculiar to battery eliminators.

In the following pages you will find technical and constructional data for B-eliminators, A-eliminators, C-eliminators, power amplifiers, and combinations of all of them. While there are references for a

host of impedance-coupled amplifiers herein, no references will be found on resistance-coupled audio amplifiers. A seperate treatise on such will be found in Volume VII.

The evolution of battery chargers preceded the practical evolution of battery eliminators by about five years, and is a story in itself, but offers little of practical merit in terms of the premise for these Sketch-Books, although such a story would undoubtedly show the extent of imagination and pioneering spirit afflicting some early workers. There is a grey area between AF amplifiers, particularly of the pushpull type, and the latter-day preoccupation with audio fidelity. Advances in fidelity probably began with the Loftin-White designs, until they turned over all of their patents to RCA in 1929. Several of the Loftin-White in house circuits will be found in the following pages.

Scott showed great imagination and ingenuity in his elabourate audio systems, but perhaps because of his New Zealand up-bringing... which was during his time more British than the Crown, itself...his systems have always struck me as having been over-designed, over-stressed, and over-elabourated upon. Modern British engineering, it would appear, still carries on that tradition.

The early push-pull amplifiers were prone to squeal, especily at the higher frequencies. This was due in most cases to an imbalance in the push-pull stage. The conventional "fix" of the period was to connect a .00025 to .001 MFD condenser across one side of the AF SEC.

Like most every aspect of early Radio, early battery eliminators had their peculiarities. For example: if an eliminator was placed too close to a set, an intense hum would always develop - from mechanicical vibration of the eliminator, or the electro-magnetic induction among the elements of the eliminator. Variable resistors were another cause of noise, due chiefly to the fact that many early rheostats, and potentiometers were of insufficient current carrying capacity. At least 200 mA is a good figure to consider.

Eliminators using fixed resistors sometimes failed to pass a critical voltage for maximum sensitivity, volume, tone quality. Voltages for RF tube plates was always critical regarding sensitivity and tone. A drop or an over-load on the DET made all the difference between extreme sensitivity and sharp tonal renditions, or less sensitivity with mellow reproduction. Plate voltages for AF tubes had to be properly balanced or distortion would result, especially if the C-bias voltage was off. It is not uncommon to find a C-voltage on some early schematics as high as 60.

Terminal corrosion was always a big problem in early eliminators, and it has been my experience that generous applications of General Cement's DE-OX-ID works impressively well to remove it.

COLOUR-CODES OF EARLY POWER TRANSFORMERS

Prior to the late Thirties, not all manufacturers of power transformers abided by the RME colour-code for their leads. RCA is an excellent case in point, although RCA accepted RME standards after 1940 - chiefly because the Military insisted. Old transformers are interchangeable as no change was made in their electrical characteristics - for example, RCA power transformers can be interchanged with RME-coded transformers, and vice versa. The following data will help you in that.

	Old Colour-Code	RME Code
Rectifier Filament	Grn. w/ Red Tracer	Yellow
Amplifier Filament	Blue	Brown
H.V. Secondary	Brown	Red
H.V. Primary	Brown & Black	Red & Yellow

There were three types of Primary windings employed in early power transformers, and were coded as follows;

	Old Colour-Code	RME Code
Single 110V Primary	Red	Black
Double 110-120V:		
#1 PRI Start	Red	Black
#1 PRI Finish	Red & Black	Blk. & Yel.
#2 PRI Start	Red & Yellow	Blk. & Grn.
#2 PRI Finish	Blk. w/ Red Trace	Blk. & Red
Tapt Primary, 110-240V Start	Red	Black
110V Tap	Red & Black	Blk. & Yel.
Finish (Both)	Blk. w/ Red Trace	Blk. & Red

Replacements were usually without shields or casings. The early practice was to remove the shell from the old transformer and place it on the new unit.

IF & RF TRANSFORMER LEADS NOTE:

Prior to 1935 there were no RME colour-codes for the leads of IF and AF transformers. When working with such transformers, identification of leads can be established with an ohmeter, checking for continuity between pairs of leads.

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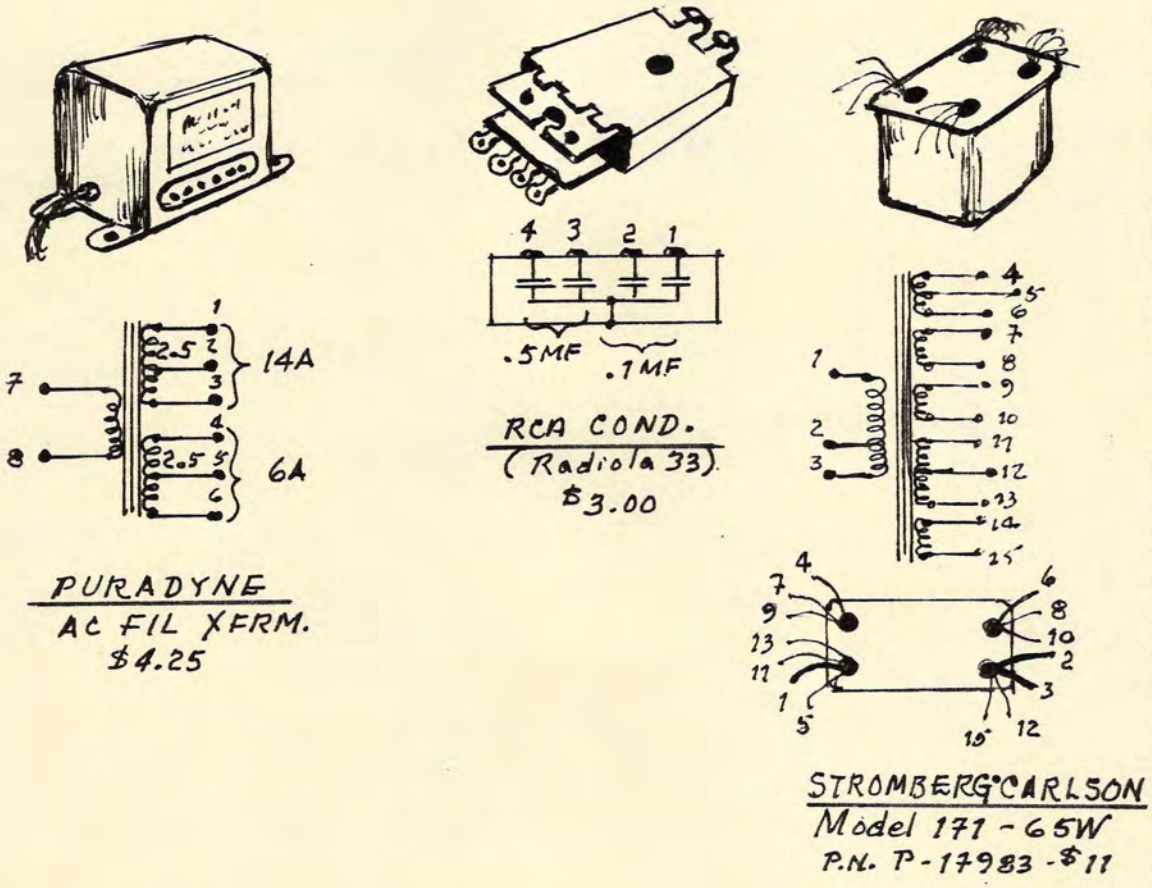
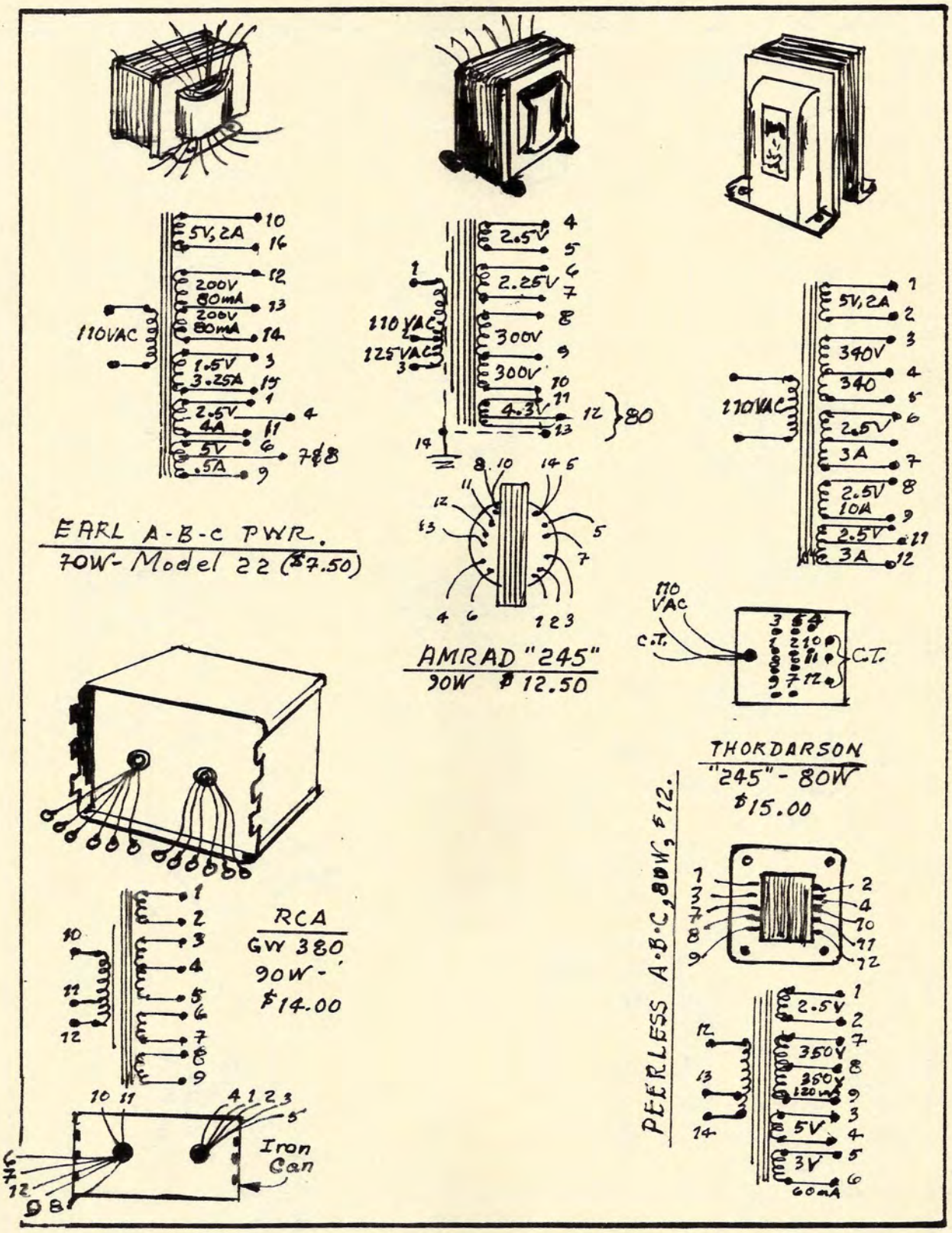
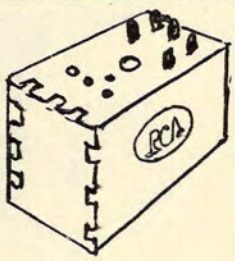
TRANSFORMER & CONDENSER BLOCK DIAGRAMS

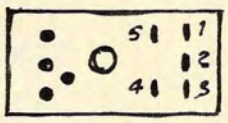


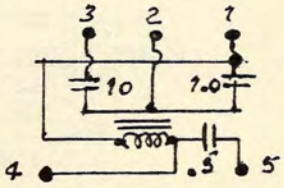
Internal connexions of old potted transformers and condenser blocks are non-existent. The following sketchs show the details of a few which could of aid to you in checking out an old potted unit before you pull it. Oddly enough, many of the vintage potted units are still viable and will perform as originally designed, as long as there is no excessive surge voltage.

It is not recommended that you boil out any vintage potted unit, unless you're merely curious as to how it was done. I might also mention that you will find many of the old paper or tin-encased condensers are still working at their prescribed voltages, and naturally add a bit of authenticity to the restoration of an old circuit.

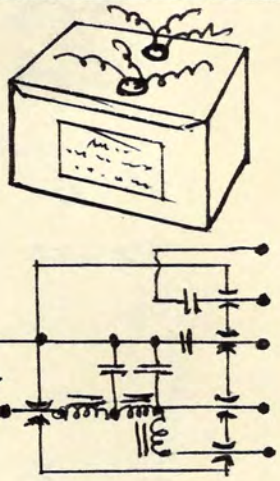

5V, 2A
200V 80mA
200V 80mA
110VAC
1.5V
3.25A
2.5V 4A
5V .5A
EARL A-B-C PWR.
70W - Model 22 ($7.50)
2.5V
2.25V
300V
300V
4.3V
110 VAC
125VAC
80
AMRAD "245"
90W $12.50
5V, 2A
340V
340
110VAC
2.5V
3A
2.5V 10A
2.5V
3A
110 VAC
C.T.
THORDARSON
"245" - 80W
$15.00
RCA
GW 380
90W -
$14.00
Iron Can
PEERLESS A-B-C, 80W, $12.
2.5V
350V
350V 120mA
5V
3V 60mA



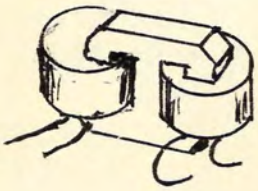


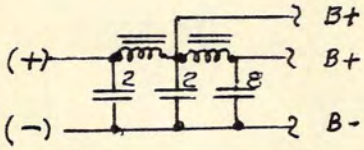


RCA 600V
COND. BLOCK
$7.40
(Radiola 17, 18, 33, 51)

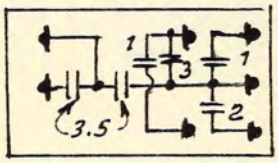


A-K 37-38
CHOKE & COND
BLOCK - $7.50

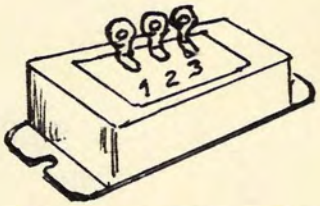




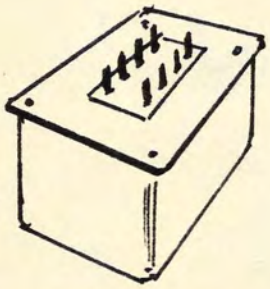
EARL
30 Henry
42mA or 90mA
$6.50

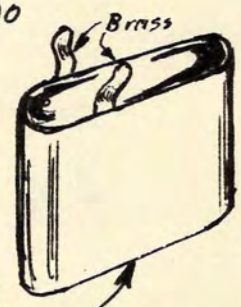


RCA COND. BLOCK
(Radiola 17 & 50)
$19.20

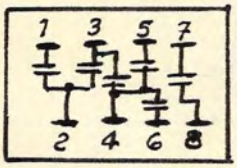


STROMBERG-CARLSON
AF FILTER CHOKE
3½" x 1½" x 1¾"
$2.00





NOTE:
Stromberg-Carlson's Thin Cond. Were Usually 3.5 mf, 400V.
(Used by several manufacturers.)



($15)

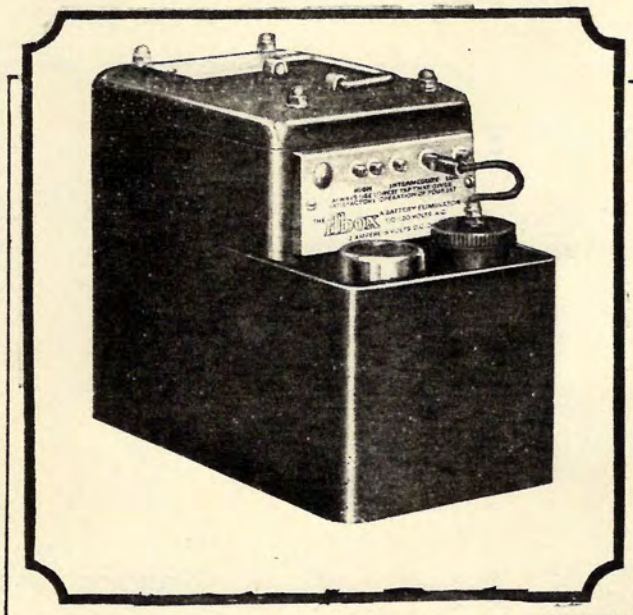
STROMBERG-CARLSON
#638 COND. BLOCK

A 'B-H' NOTE

Just how extensive was the interest in A-B-C battery eliminators in the latter days of the Twenties is rarely comprehended. Most hobbyists are well-aware of the fact that the 80-type tube became the work-horse of practically all power units well into the Sixties, but the advent of the Raytheon "B-H" was a marked contribution to search for a compact and dependable battery eliminator. That the 80-type was made standard in later years was due simply to the fact that it was a cheaper item to produce, and perhaps a bit more rugged, even though its longevity was not equal to the "B-H", and that the "brute force", as it was called, type of eliminator was easy to construct.

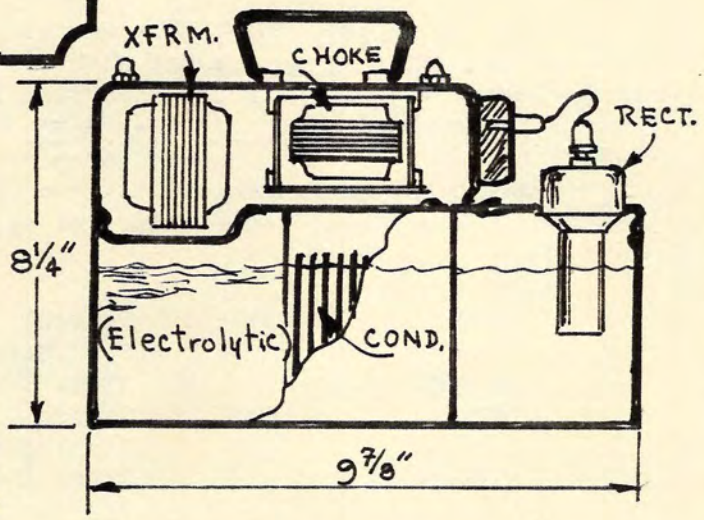
As an indication of just how extensive was the interest, not only among home-constructore but also commercial firms, in the "B-H", the following list is appended for your edification. It reflects only those manufacturers employing the "B-H" in their eliminators from the winter of 1926-1927, but they should give you the idea. While you may not recognize all of the names, their mere inclusion is suggestive of just how wide-spread was the allure of early Radio.

Acme	Durkee	Federal	Pioneer
Acme Electric	Eagle	Ford Mica	Precise
All-American	Electron	Freed-Eisemann	Precision
Amplex	Epom	General Instr.	Premier
Apco	Erla	General RAdio	Prest-O-Lite
Arborphone	Operadio	Gilfillan	Silver-Marshall
Arca	Ozarka	Grant	Simplex
Batteryless	Paragon	Grebe	Spartana
Benjamin	Pilot	Greene-Brown	Sparton
Bosch	Wise	Jefferson	Standard Radio
Bremer-Tully	Yale	Jordan-Carish	Standard (Canada)
Buckwalter	York	Kingston	Sterling
Buell	Zenith	Knight	Stewart
Burns		Kodel	Thordarson
Bush & Lane		Majestic	Timmons
Case		Malone-Lemmons	Triple A
Chamberlin		Martin-Copeland	United Engine
Cloverleaf		Mayolian	Universal
Colonial		Metrodyne	U.S. Light
Consolidated		Midwest	Valley
Cornell		Modern	Varion
Crosley		Mohawk	Walker
Day-Fan		Mu-Rad	Warren
Dongan		Muter	Webster
Dragon		National	Wells
Dubilier		Nat'l. Lead	White



ABOX's FIRST "A" ELIMINATOR

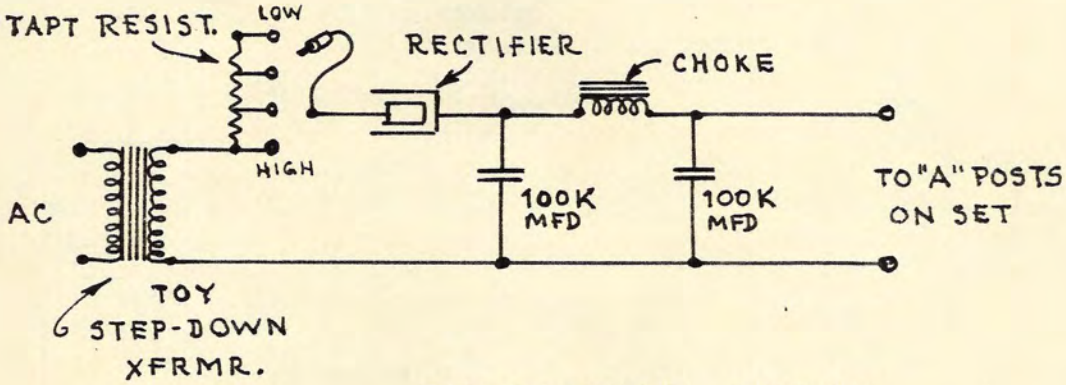
(1927)



200 MFD CONDENSER CONSISTS of NICKEL & IRON Pls.

ELECTROLYTIC IS A SOLUTION of CAUSTIC POTASSIUM.

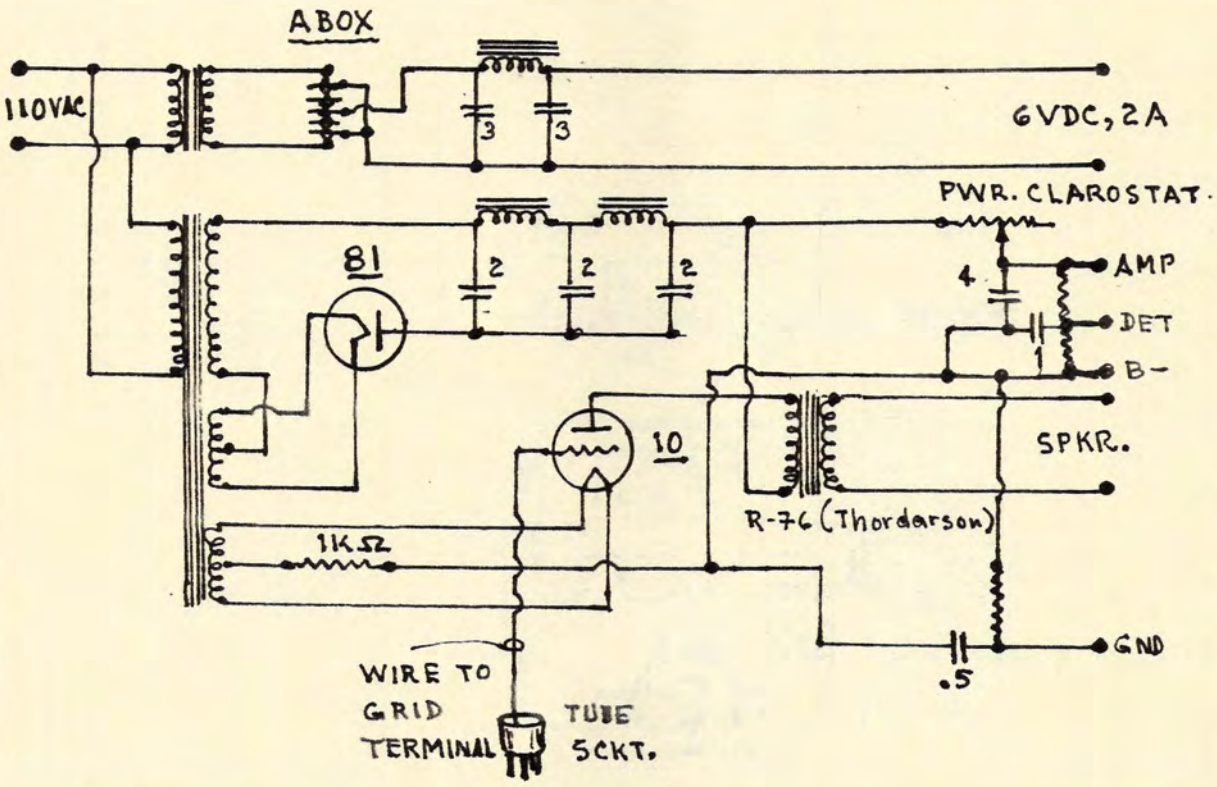
OUTPUT = CONSTANT 6V, @ 2A.



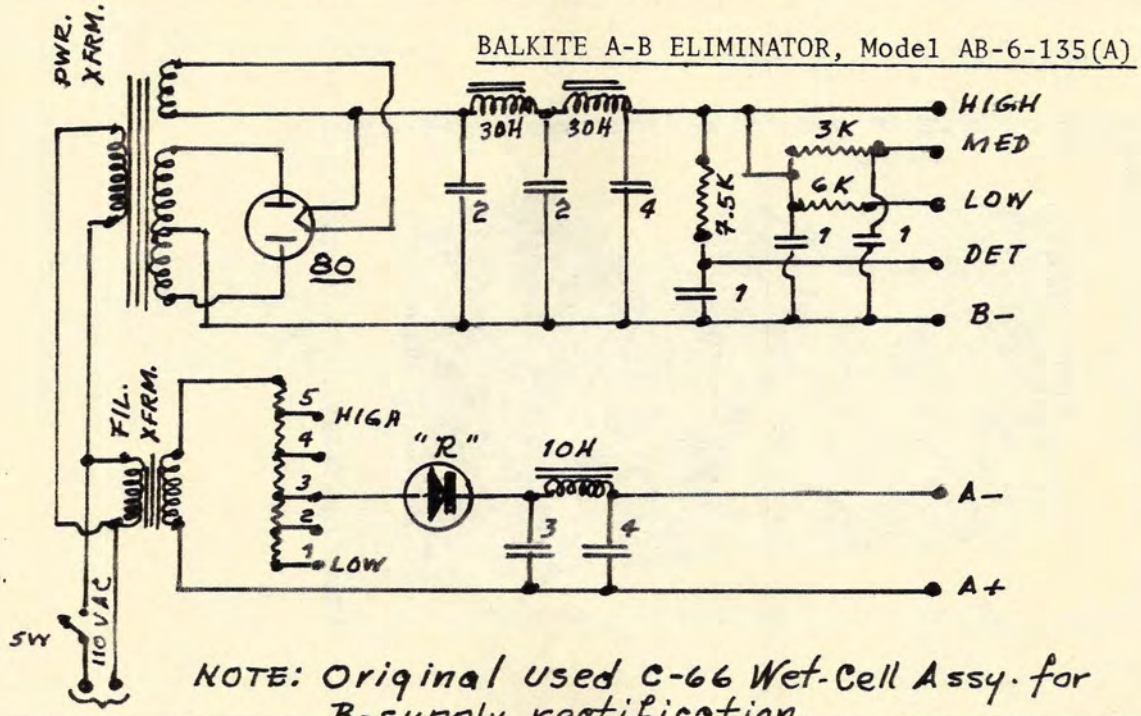
THEORETICAL CIRCUIT

Electrolytic is one side of condenser; the plates are the other side.

ABOX A-B ELIMINATOR & AMPLIFIER, 1928



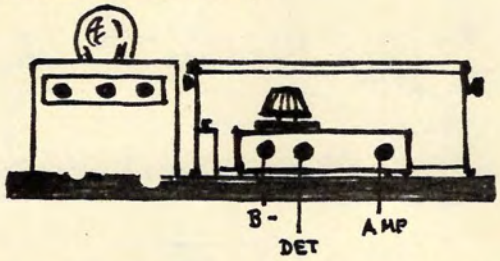
BALKITE A-B ELIMINATOR, Model AB-6-135(A)



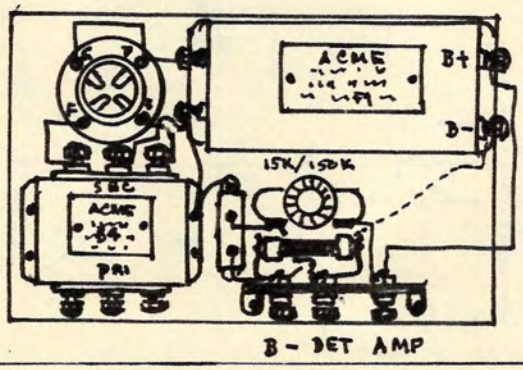
NOTE: Original used C-66 Wet-Cell Assy. for B-supply rectification.

TWO ACME POWER SUPPLY CONFIGURATIONS

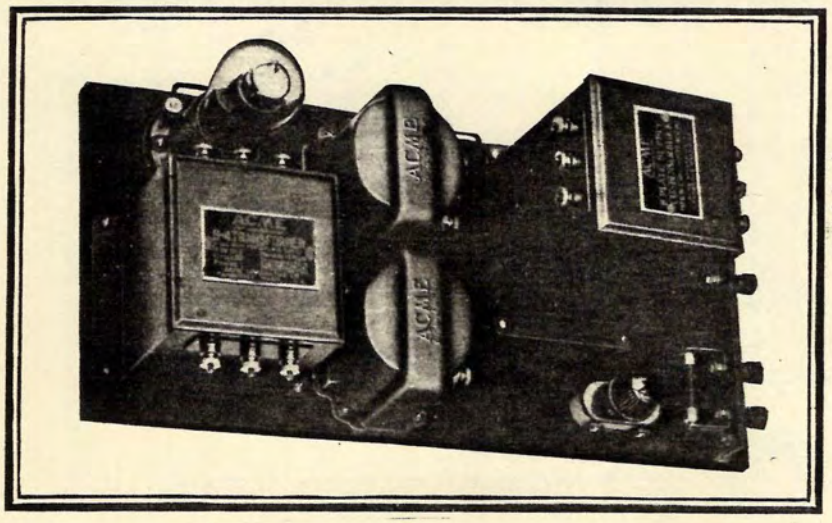
MODEL EK-1 LAYOUT:



180VDC Maximum Output; Would handle Up to (12) 01A Tubes.

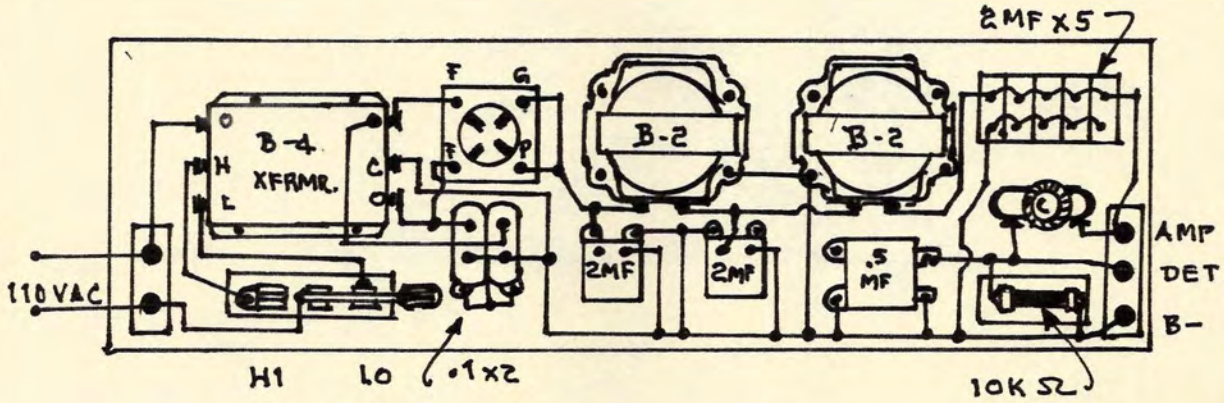


B-ELIMINATOR KIT, 1926:



Acme B-4 Transformer.
Acme B-2 Chokes (2).
Raytheon B-H Tube.
#10 Bradleyohm.

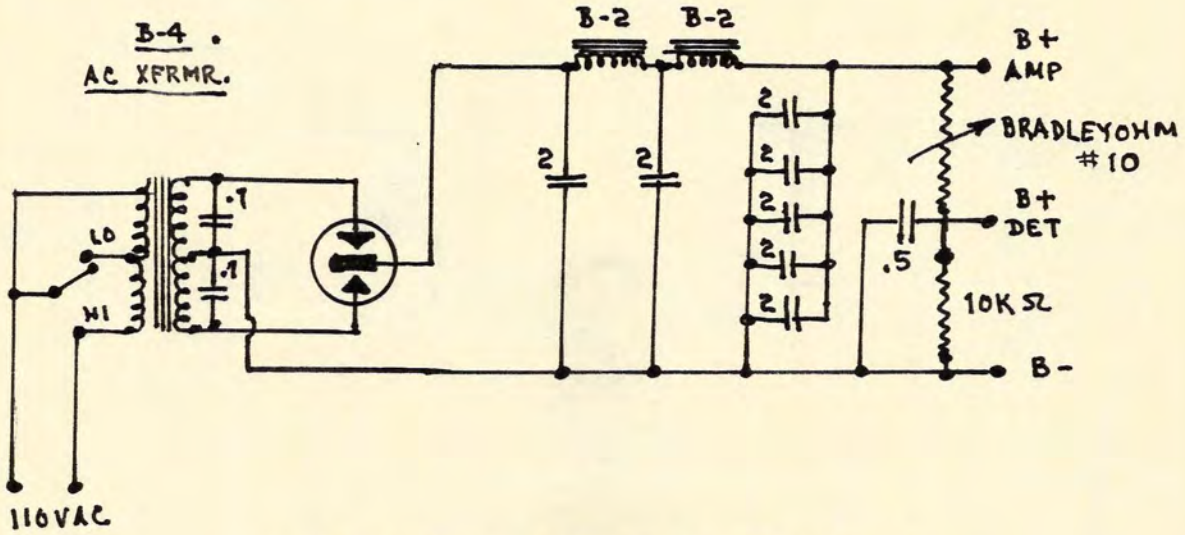
ACME 5-TUBE REFLEX "B"-ELIMINATOR, 1926



PLAN VIEW OF LAYOUT

ACME B-4 Power Transformer.
ACME B-2 Power Chokes (2).
BRADLEYOHM 150K Ohms.
SPST Switch (Not needed for modern mains.)
2 MFD Condensers (7).
"B-H" Rectifier Tube.

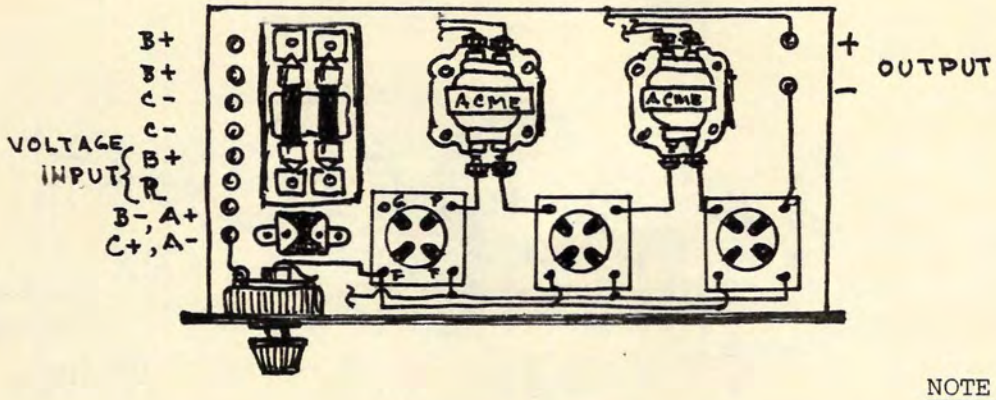
Original ACME design called for grounding all units to a Common; it may not be necessary.



An 8 MFD electrolytic may be substituted for the string of (5) 2 MFD condensers.

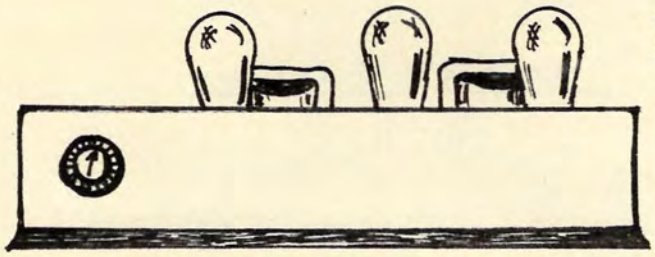
(CB 6-26)

ACME AF AMPLIFIER, 1927 (This Was A Resistance-Xfrmr. w/ Impedance Leak.)

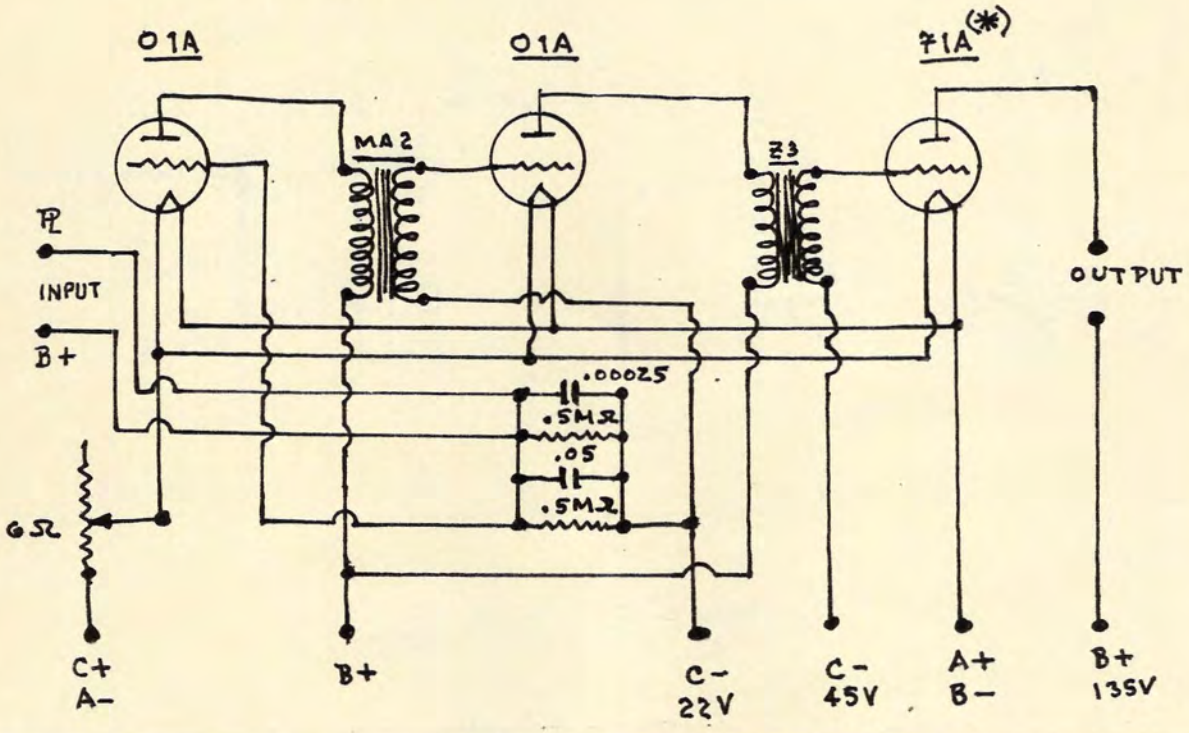


NOTE

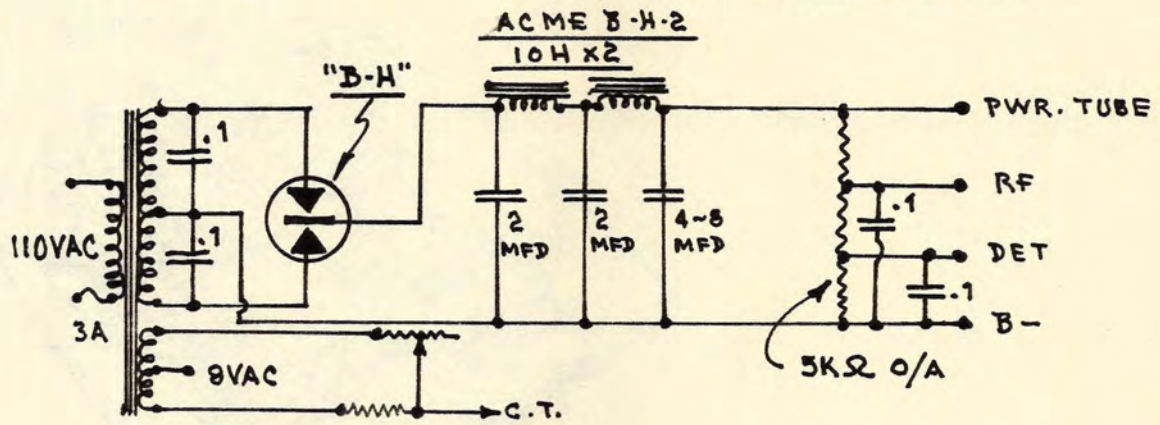
C-Bias is critical for this unit.

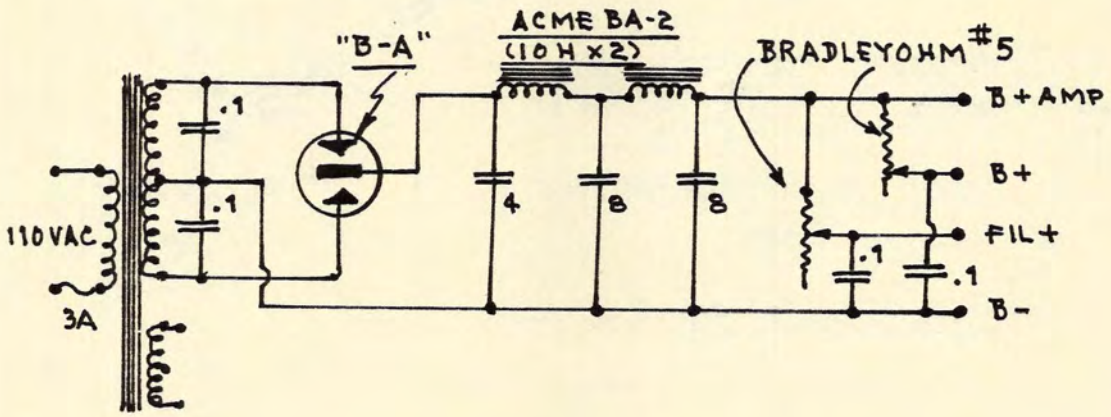


(*) = Insert 0-50 mA meter in series with plate of 71A; adjust grid-bias from C-battery until no appreciable meter deflexion occurs on a loud signal. Needle will wiggle on a strong signal,

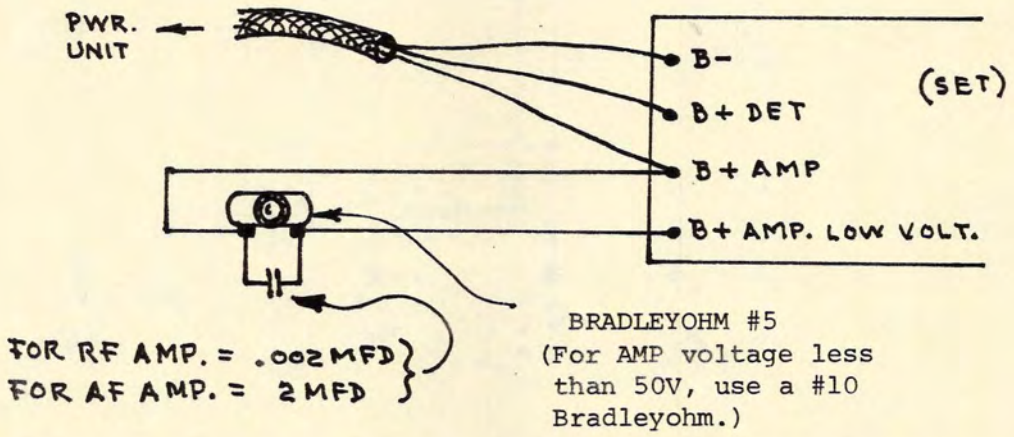


TWO ACME B-ELIMINATORS, 1927





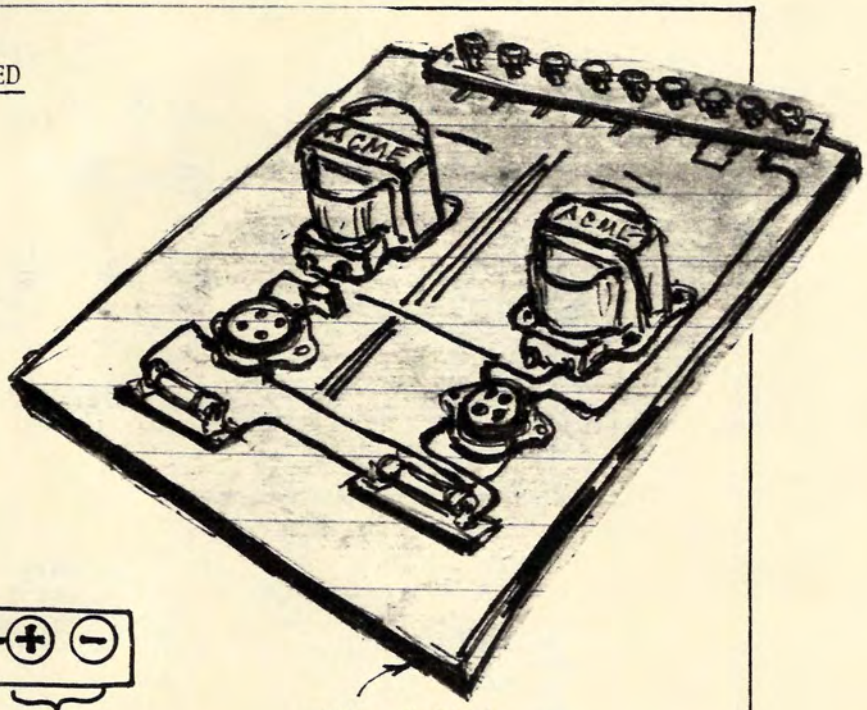
TO OBTAIN SECONDARY AMPLIFIER VOLTAGE:

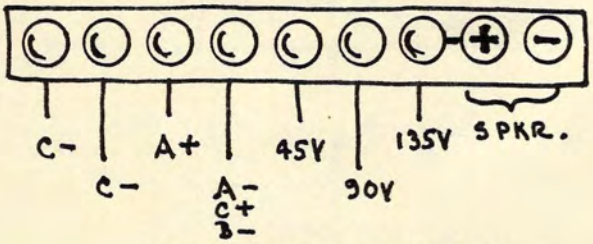


ACME TRANSFORMER-COUPLED

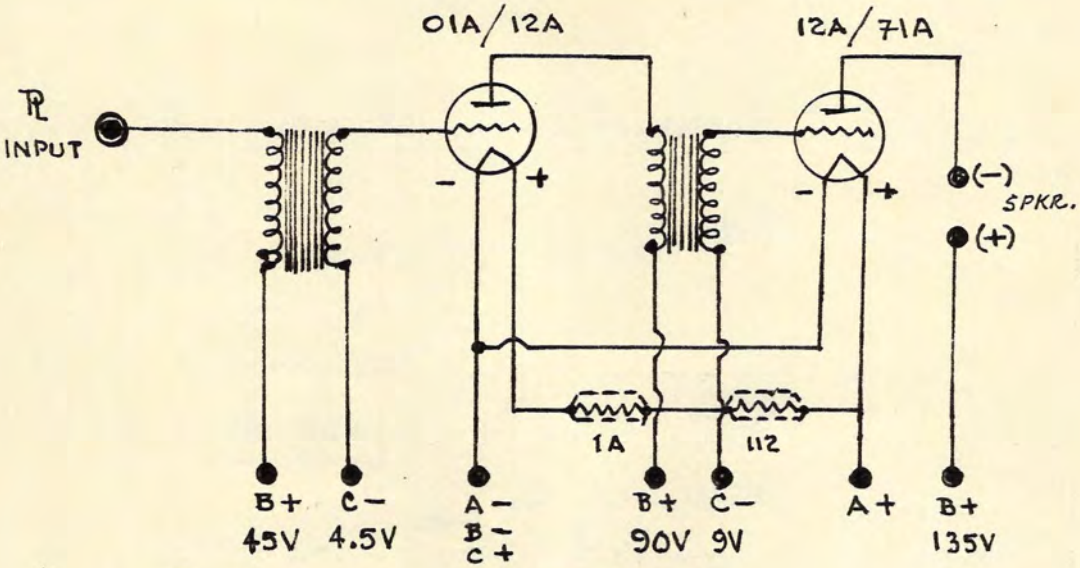
AF AMPLIFIER

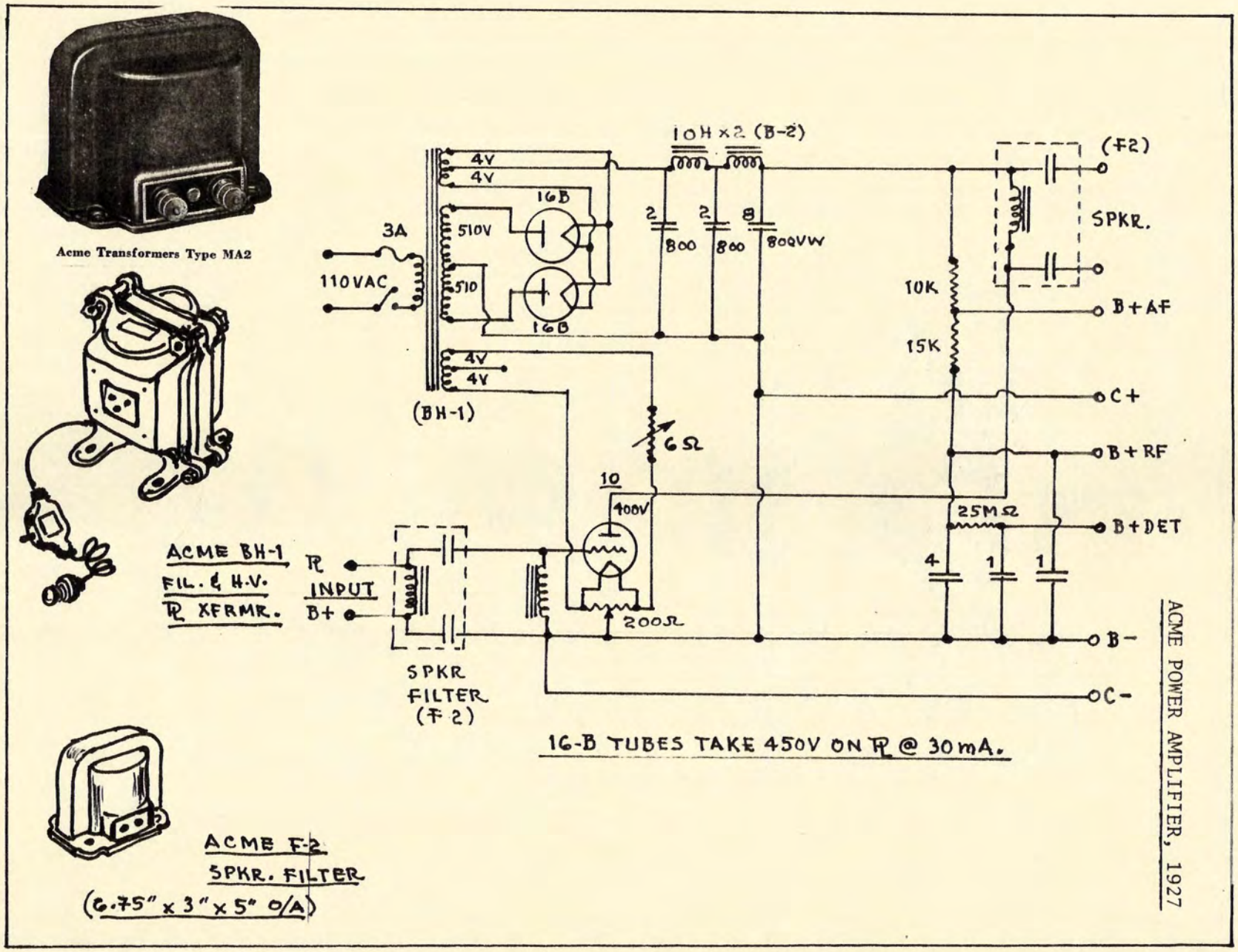
(1926 - 1927)



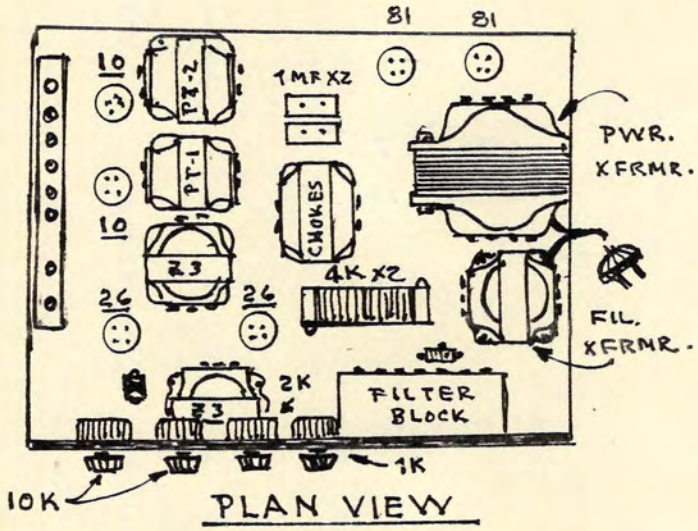


TERMINAL STRIP




Acme Transformers Type MA2
10H x 2 (B-2)
4V
4V
16B
3A
510V
110VAC
510
16B
4V
4V
(BH-1)
2
800
2
800
8
800VW
(F2)
SPKR.
10K
15K
B+AF
C+
B+RF
B+DET
B-
C-
6Ω
10
400V
25MΩ
4
1
1
200Ω
ACME BH-1
FIL. & H.V.
R XFRMR.
R
INPUT
B+
SPKR
FILTER
(F 2)
16-B TUBES TAKE 450V ON R @ 30mA.
ACME F-2
SPKR. FILTER
(6.75" x 3" x 5" O/A)
ACME POWER AMPLIFIER, 1927

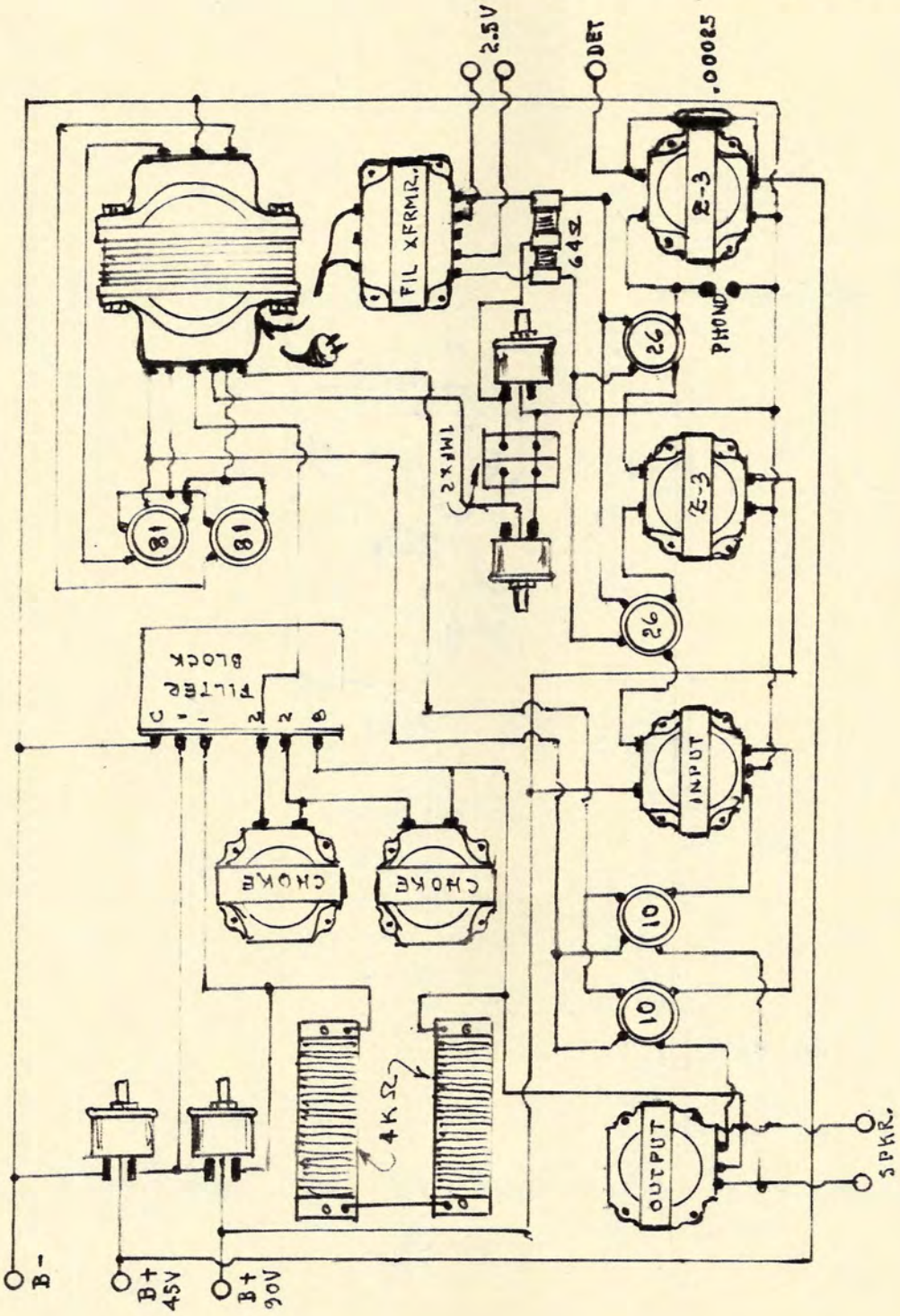
ACME POWER AMPLIFIER, 1927
(Sht. 1)



GENERAL REQUIREMENTS:

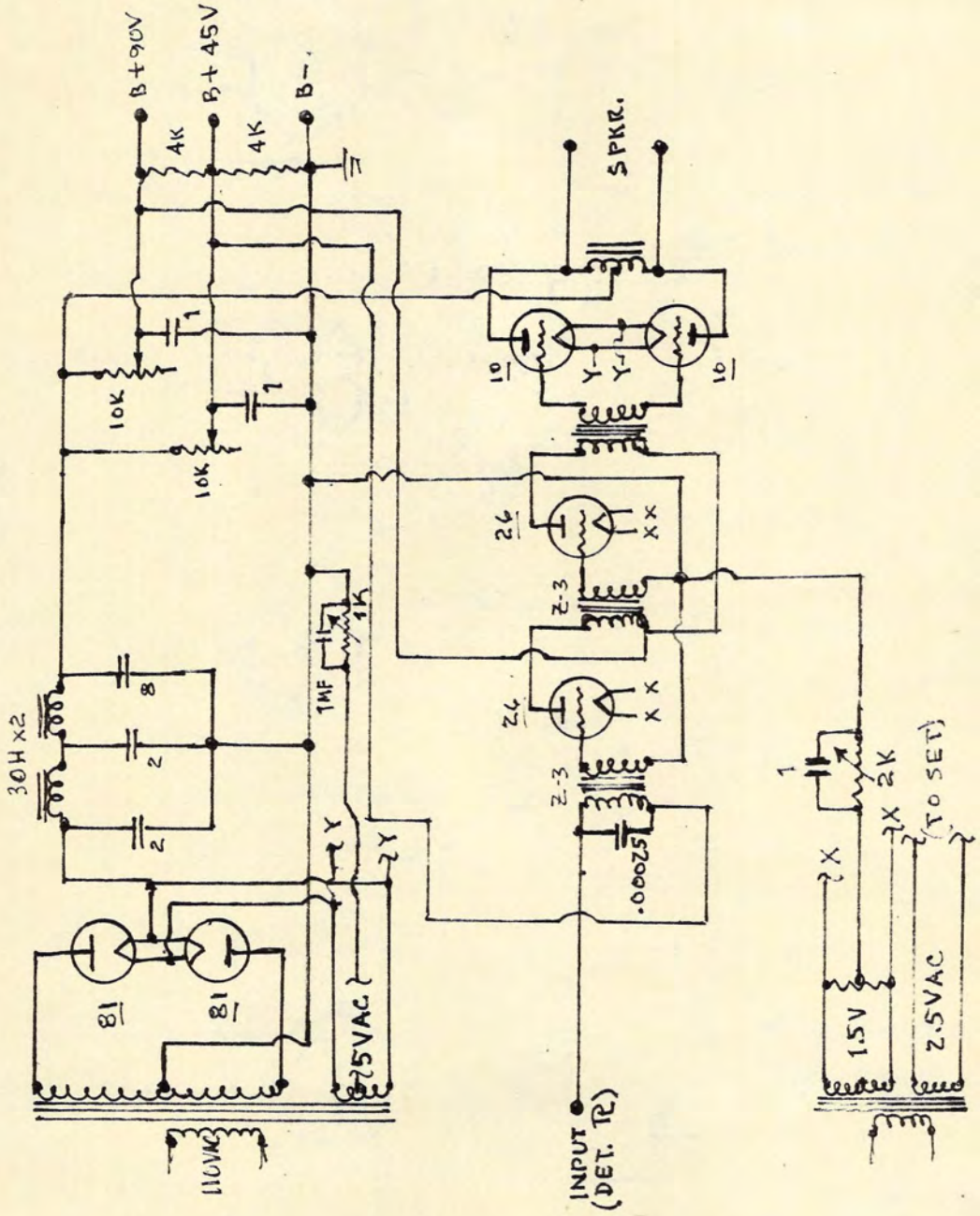
1. #14 gauge twisted wire for all FIL leads.
2. (2) Acme Z-3 AF transformers.
3. Acme PT-1 input transformer.
4. Acme PT-2 output transformer.
5. Acme BH-1 power transformer.
6. Acme FIL transformer, AC-2.
7. (2) Acme B-2 power chokes.
8. F1000 Polymet condenser block.
9. (2) Power Clarostats, 10K.
10. 2K power resistor, Clarostat.
11. 1K power resistor, Clarostat.
12. (2) 4K power resistors, Clarostat.
13. 64-ohm C.T. resistor.
14. .00025 MFD fixed condenser.
15. (8) binding posts.
16. Baseboard = 15" x 16" x ½".
17. Panel = 7" x 16" x 3/16".
18. (2) 1 MFD fixed condensers.

ACME POWER AMPLIFIER, 1927; Sht. 2

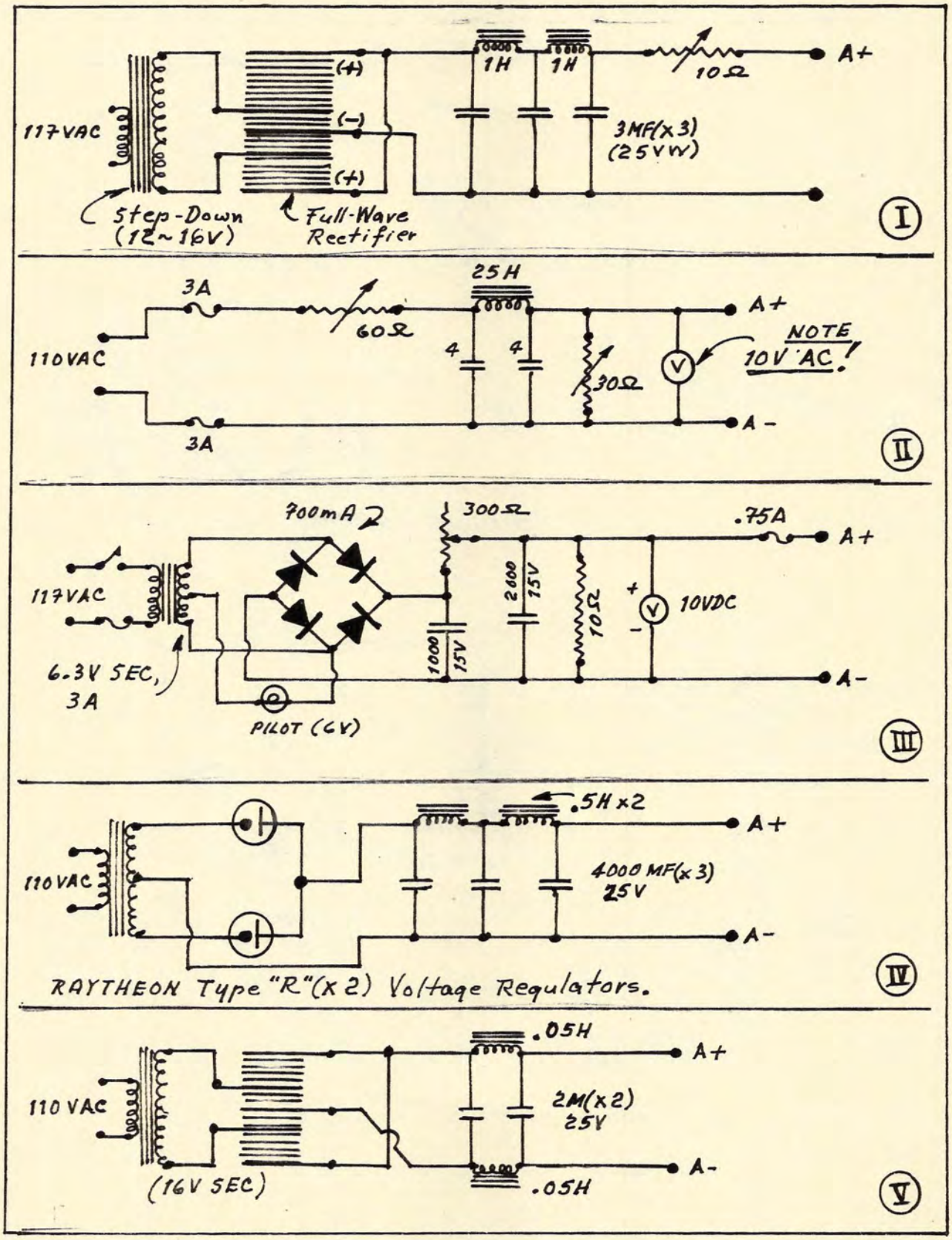


DIAGRAMATIC HOOK-UP
(See Sht. 3 for conventional schematic.)

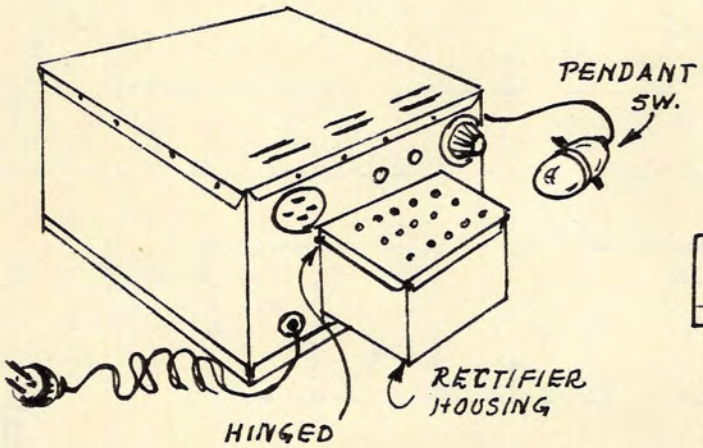
ACME POWER AMPLIFIER, 1927; Sht. 3

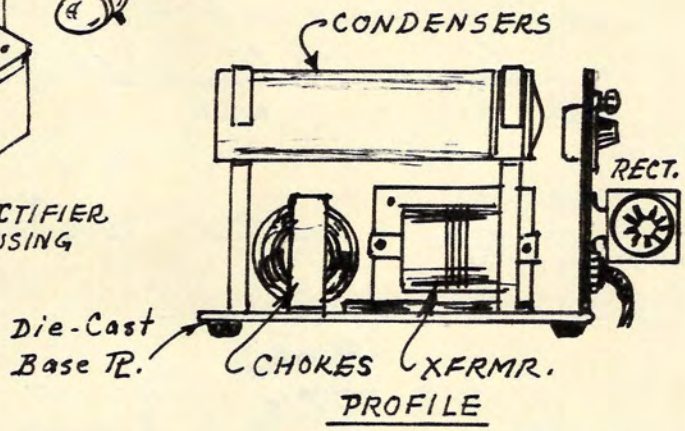


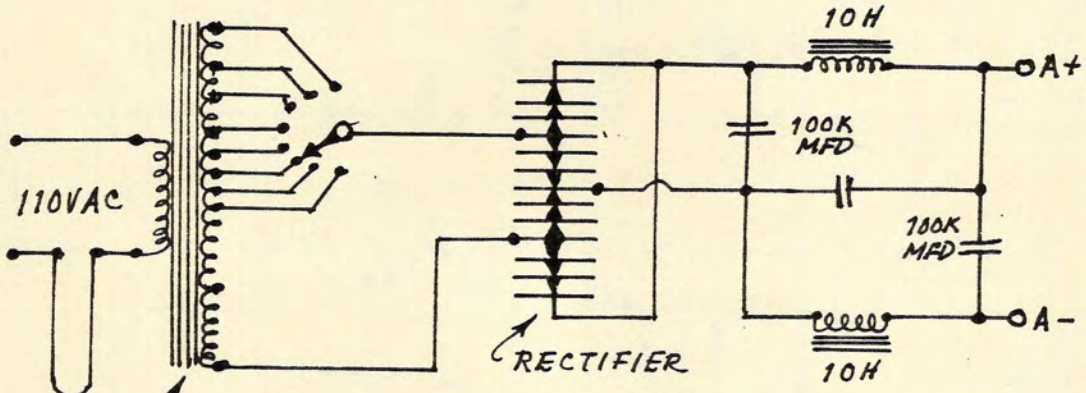
"A" BATTERY ELIMINATOR SCHEMATICS



KNAPP "A" POWER UNIT, 1928





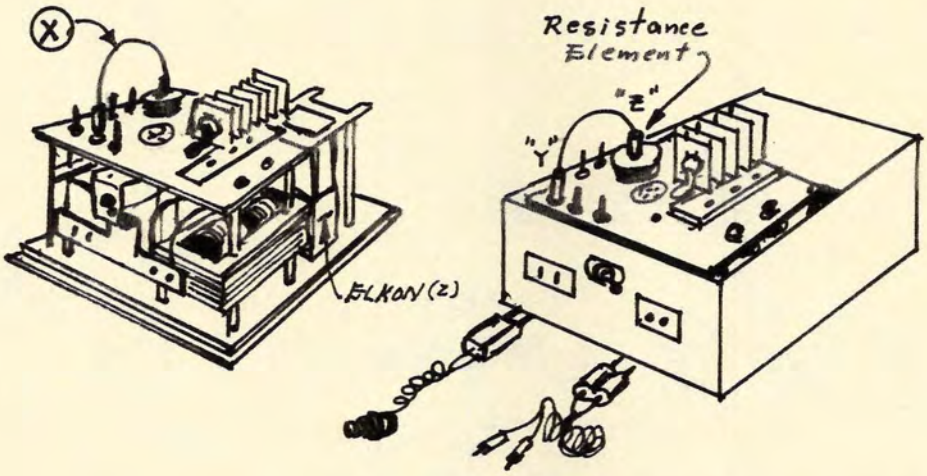


STEP-DOWN XFRMR: MAY BE TOY TRAIN XFRMR., IF IT WILL PASS A MIN. of 5A.

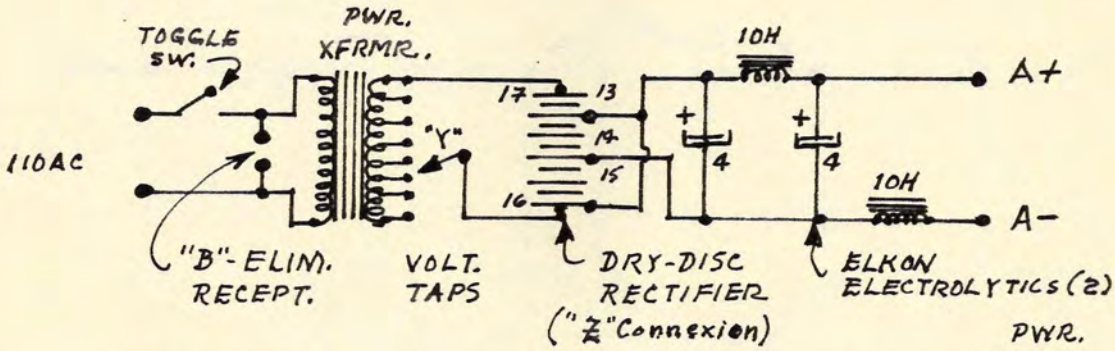
OPTIONAL VOLTMETER & RHEOSTAT (IN A- leg), TO HOLD OUTPUT @ 6VDC.

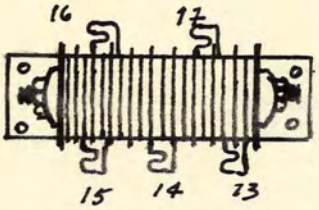
(CB WIN 29)

"A"-ELIMINATOR KIT, 1928

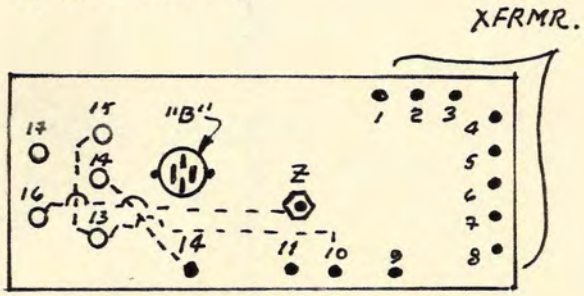


THE KNAPP "A" POWER KIT, 1928.





RECTIFIER DET.

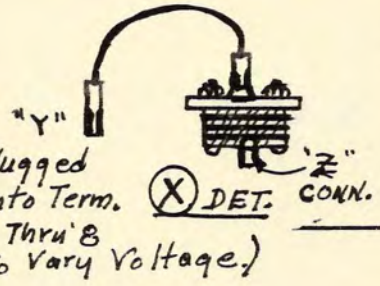


TOP TR DETAILS

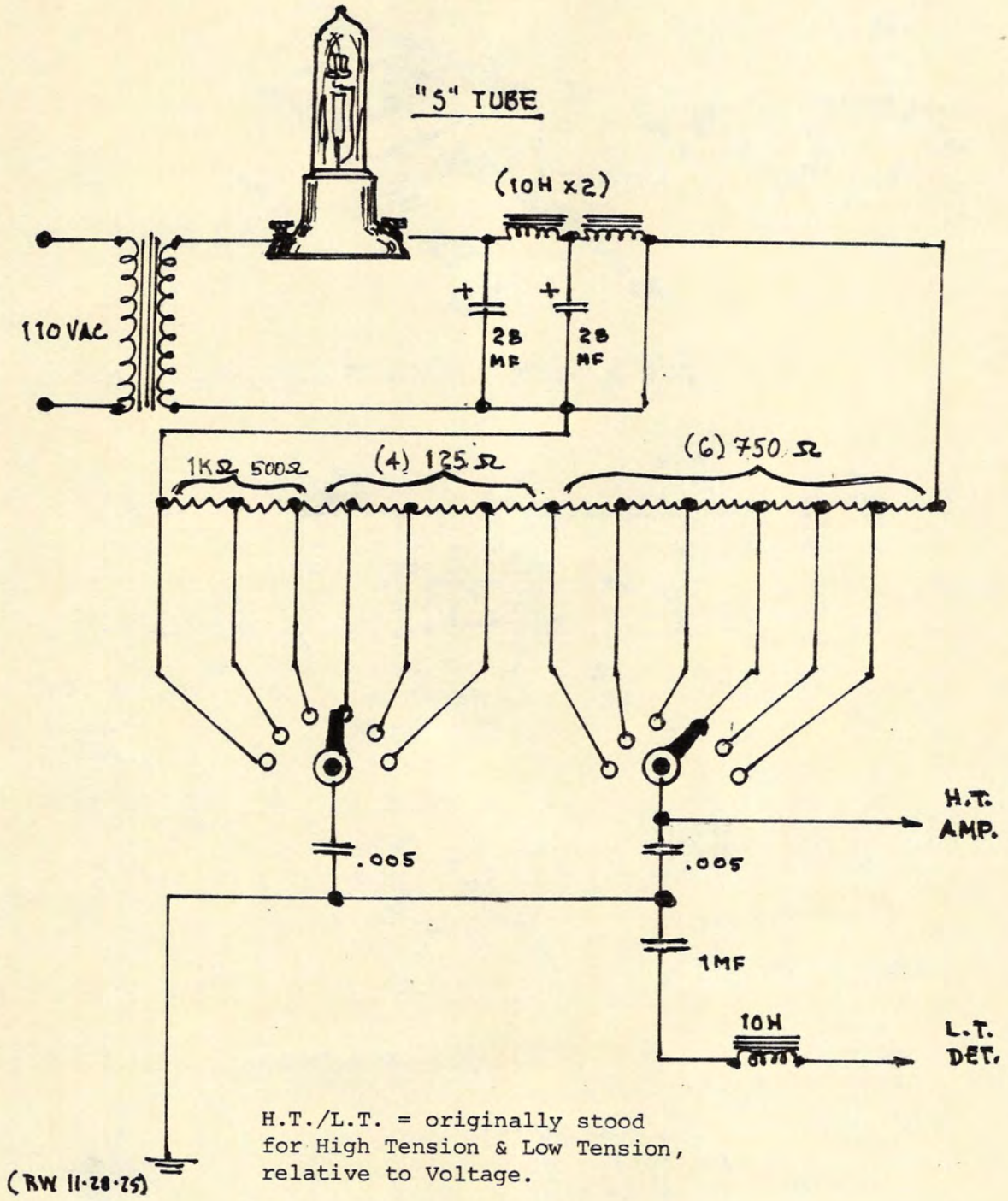
NOTES

1. 27 Terminal Clips Required.
2. Polarized DC. cord out.
3. 1K To 3K Hours of Service.
4. Copper Sulfide-Magnesium Discs, Sintred. (Plugged Into Term. 1 Thru 8 To Vary Voltage.)

(CB 3-28)

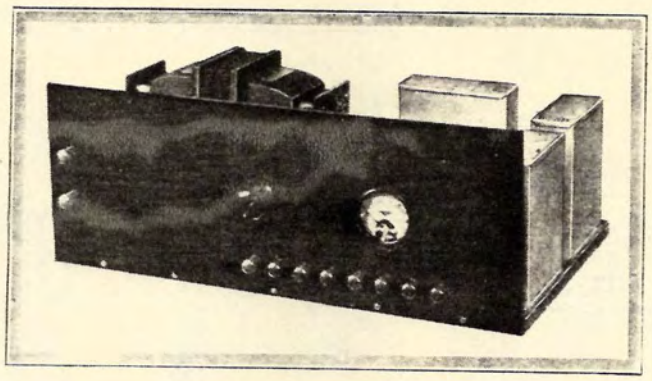


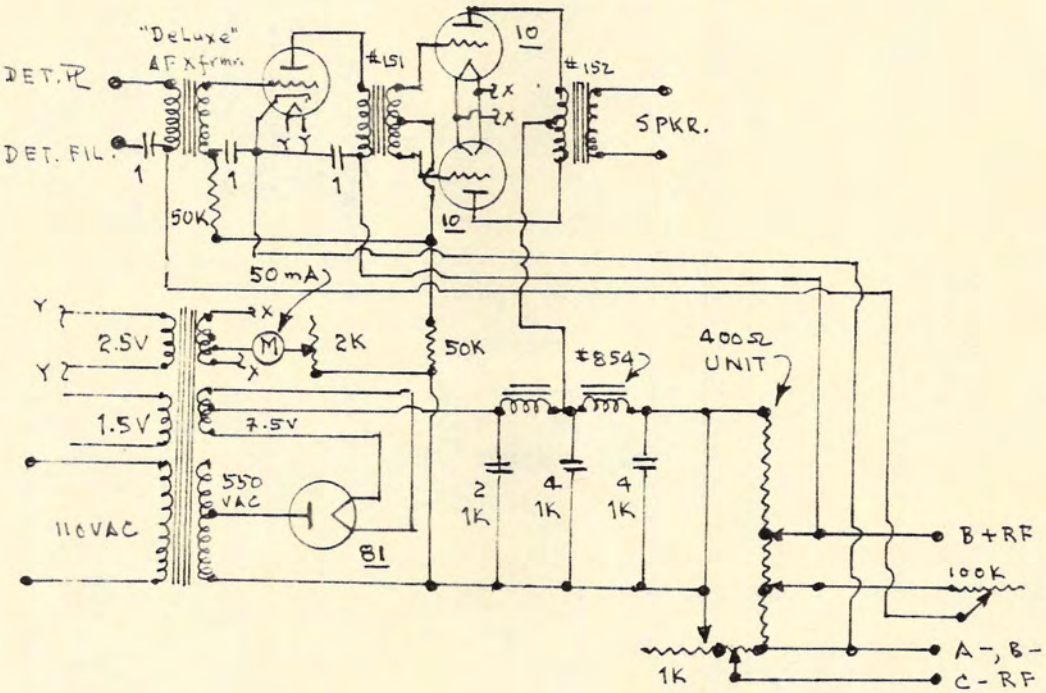
AMRAD "S"-TUBE B-ELIMINATOR HOOK-UP, 1925



H.T./L.T. = originally stood for High Tension & Low Tension, relative to Voltage.

AMERTRAN POWER AMPLIFIER, 1928



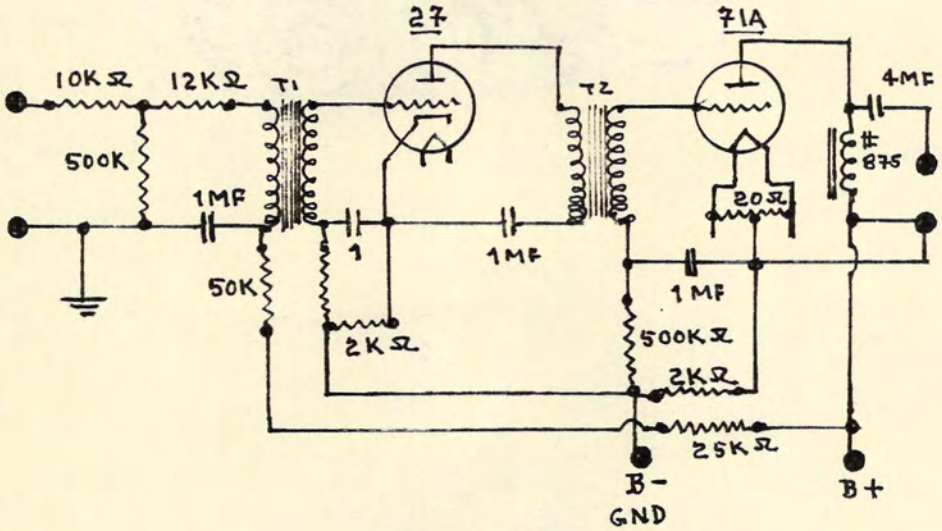


NOTES

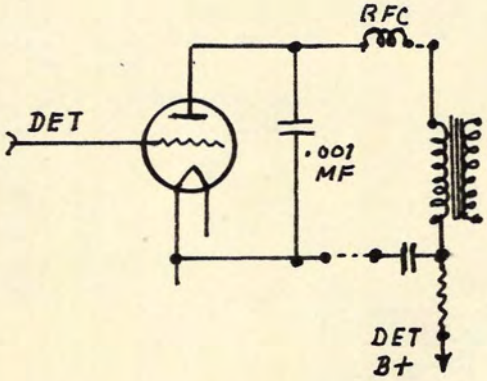
1. Part Numbers are AmerTran numbers.
2. Jewell Ammeter, 0-50 mA.
3. (3) 1 MFD, 300VDC Condensers.
4. 10 Binding Posts.
5. Panel = 7" x 18", Formica.

(CB 3-28)

AMERTRAN FILTERED AF AMPLIFIER, 1929

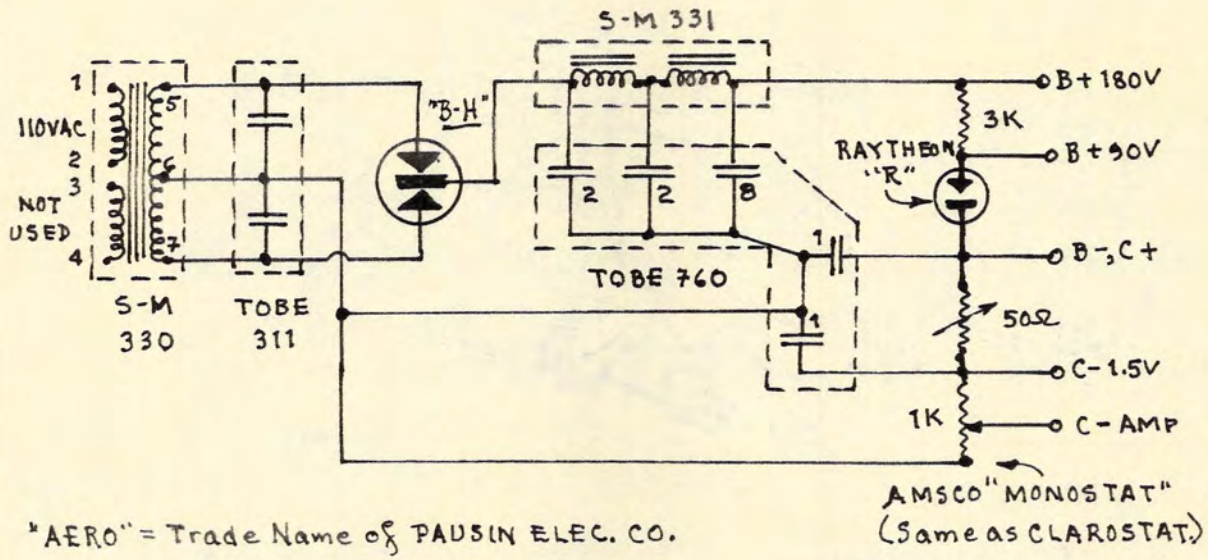


Flat frequency characteristic = 100 to 8,000 KC.
Power output = 100 mW for RMS input of 0.1V.
AmerTran "DeLuxe" AF transformers employed.



DET supply should be well-filtered and as close to 1st AF transformer as possible. This will necessitate 2 wires, as shown.

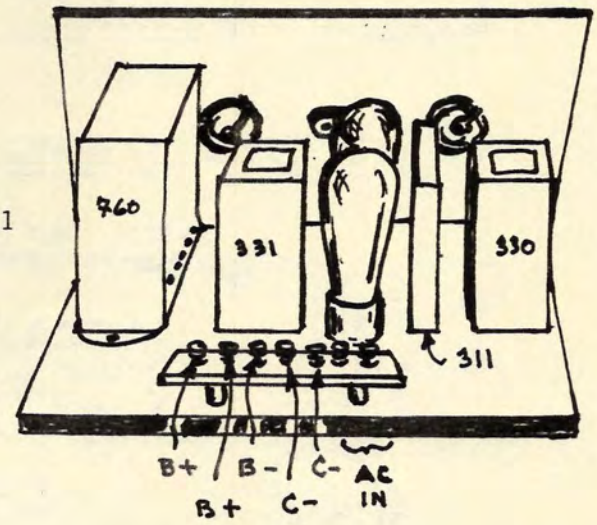
AERO-SEVEN B & C ELIMINATOR, 1927



"AERO" = Trade Name of PAUSIN ELEC. CO.

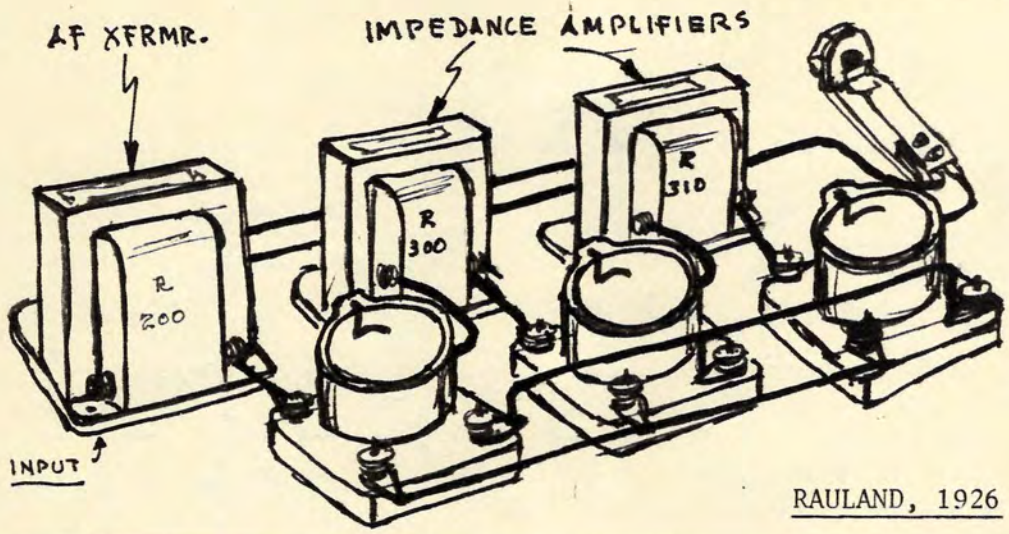
NOTES:

1. Bias voltage for DET tube was taken care of in set.
2. A 24mA was used in the Plate circuit while adjusting "C" potential for the power tube.
3. C-voltage should be varied until there is a minimum of meter fluctuation on a loud signal.
4. Pausin Electric Company made an A-B-C Eliminator especially for "Arcturus" A.C. tubes.

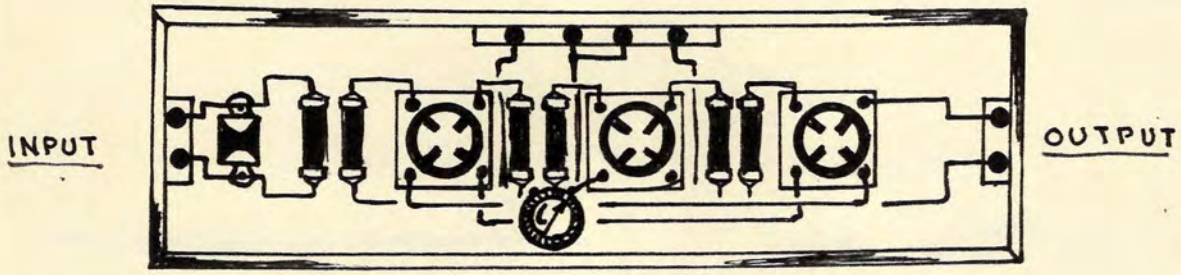


(RW 10-22-27)

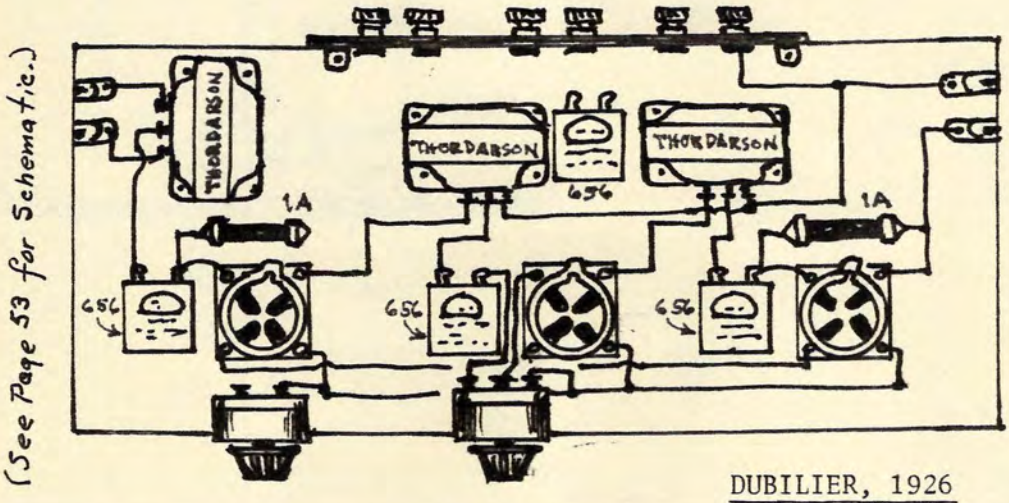
AF AMPLIFIER CONFIGURATIONS



RAULAND, 1926



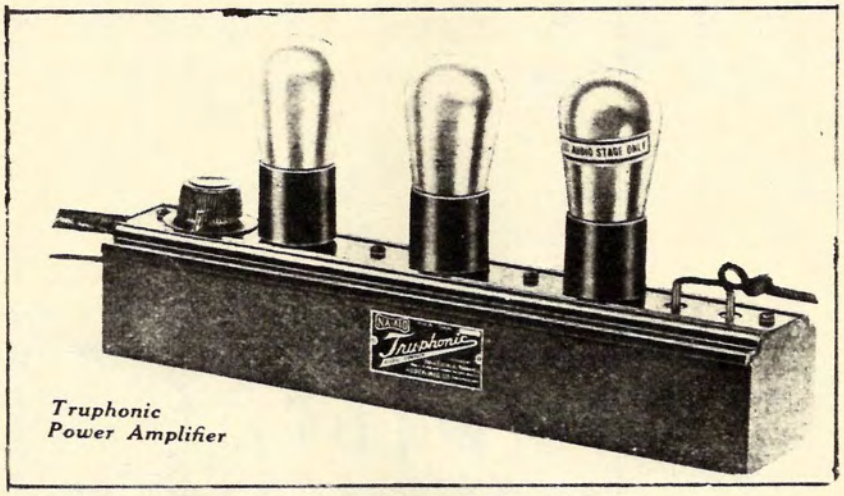
ELECTRAD RESISTANCE-COUPLED , 1925; $5



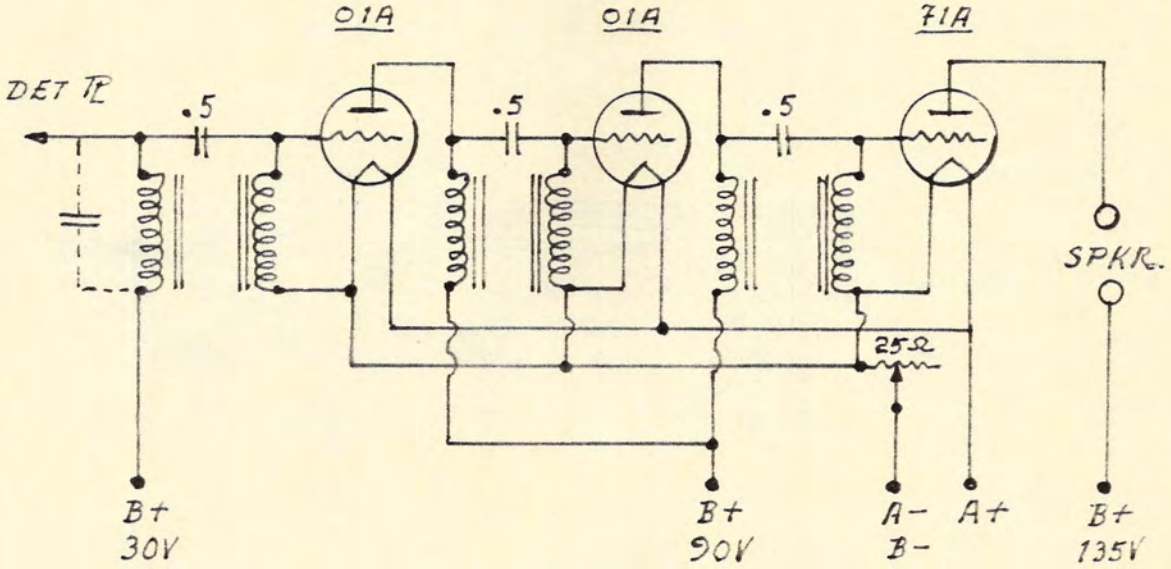
(See Page 53 for Schematic.)

DUBILIER, 1926

NA-ALD

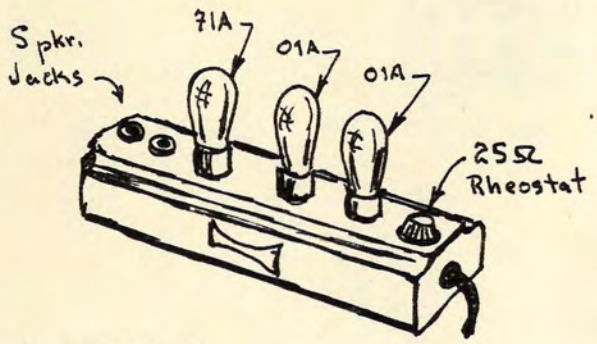


Truphonic Power Amplifier



(INVENTED BY H.P. DONLE, 1926.)

(RW-9.18.26)

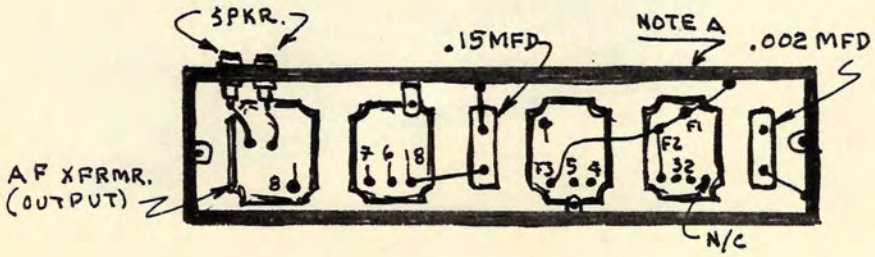


(1926 VERSION)

NA-ALD "TRUPHONIC" AF AMPLIFIER

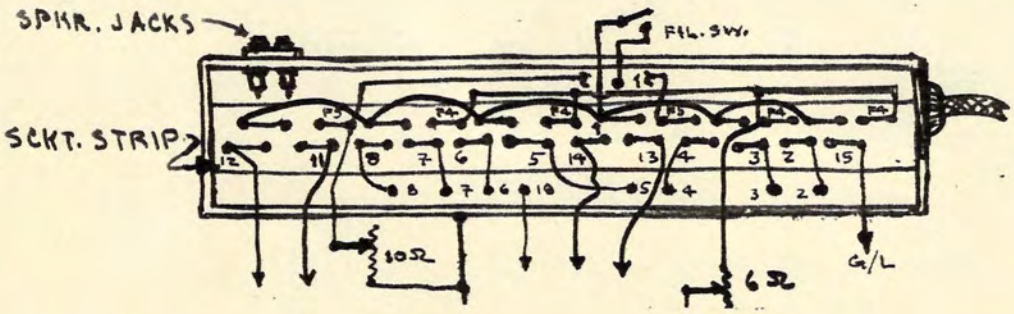
Began in 1925 as an R-C amplifier, then Impedance-Coupled from then on. (Sht.2)

3-Stages of Dual-Impedance with an output xfrmr. Same for 1926 and 1927 versions.



1927 VERSION WITH CATACOMB COVER REMOVED

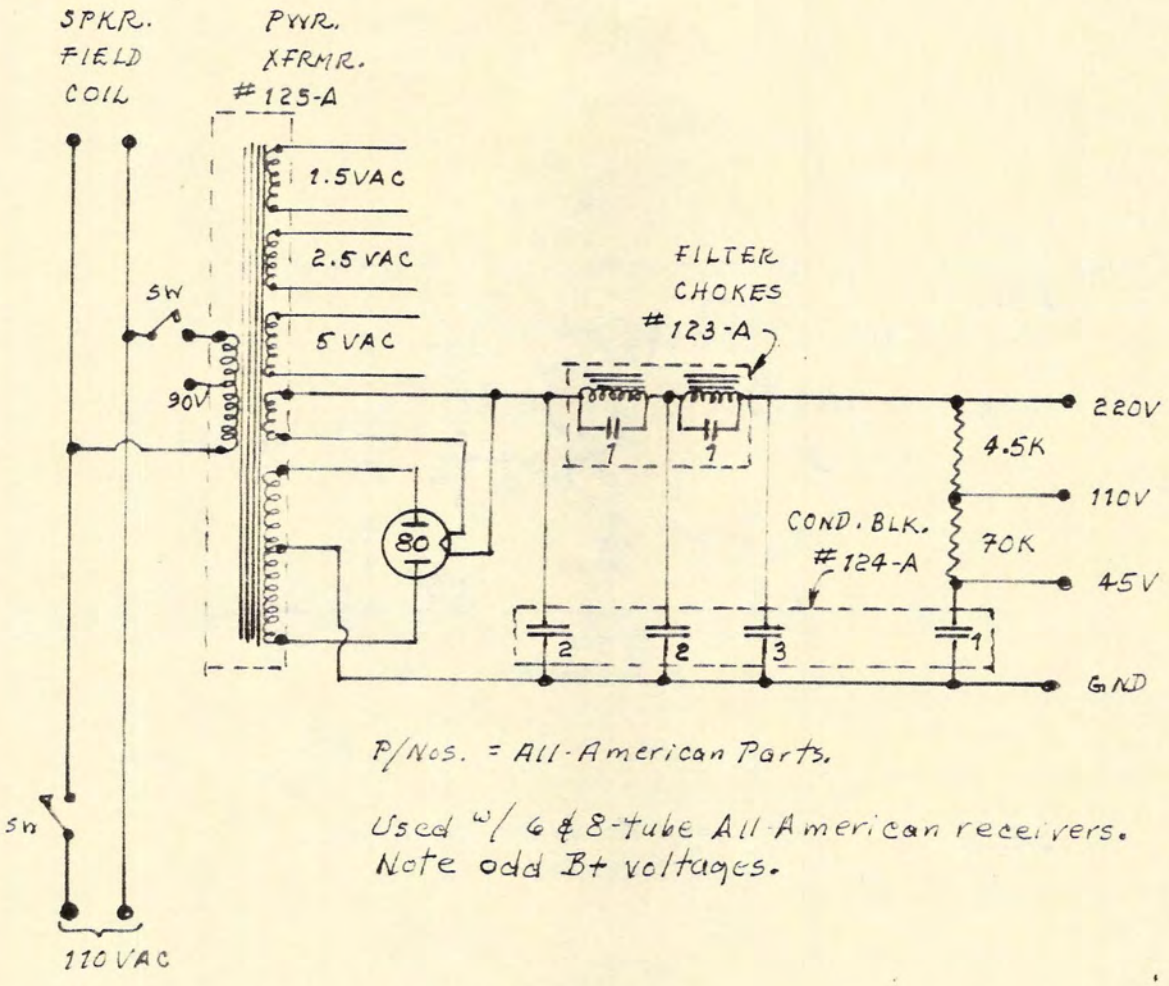
(A) = Connect as shown, unless "C" battery is used on first 2 stages.



1927 X-RAY VIEW THROUGH BOTTOM OF CATACOMB

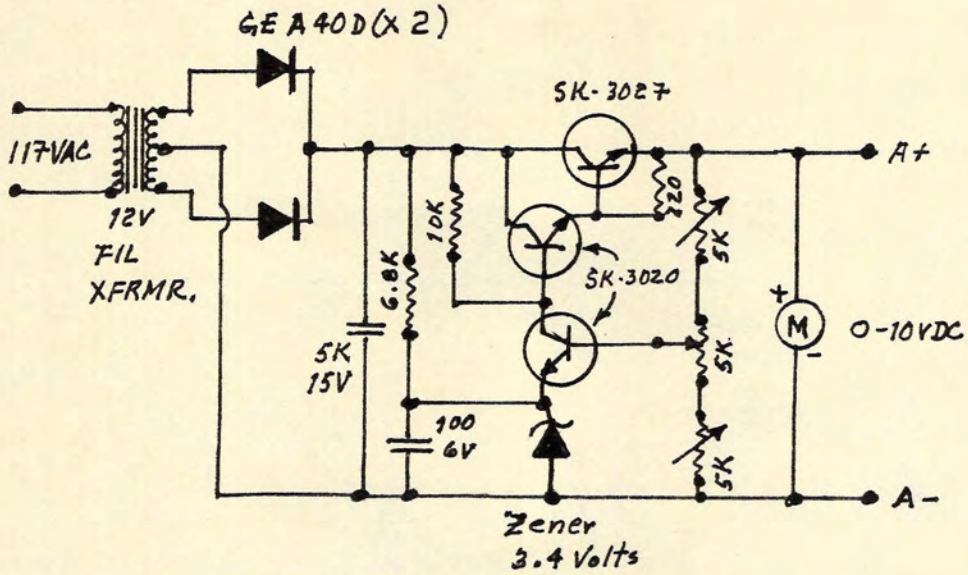
Note 1: Connect the two F5s together; then to 10-ohm.
2: Connect the four F4s together; then to the 6-ohm pot.

ALL-AMERICAN "MOHAWK" POWER UNIT, 1929



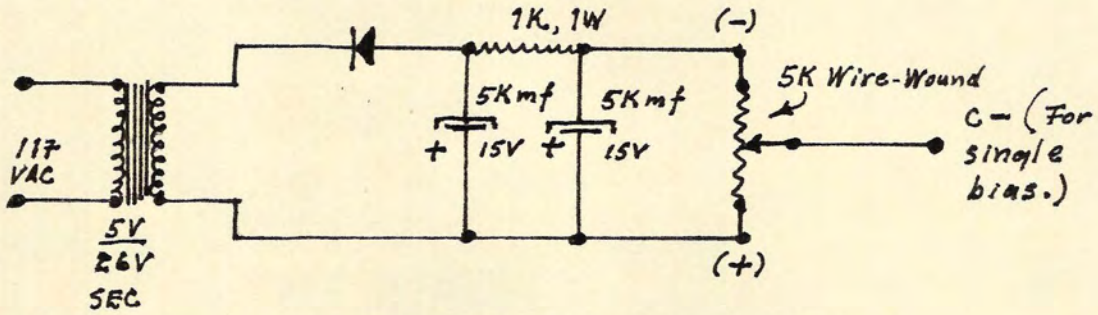
P/Nos. = All-American Parts.

Used w/ 6 & 8-tube All-American receivers.
Note odd B+ voltages.



A "MODERN" A-SUPPLY, 1972

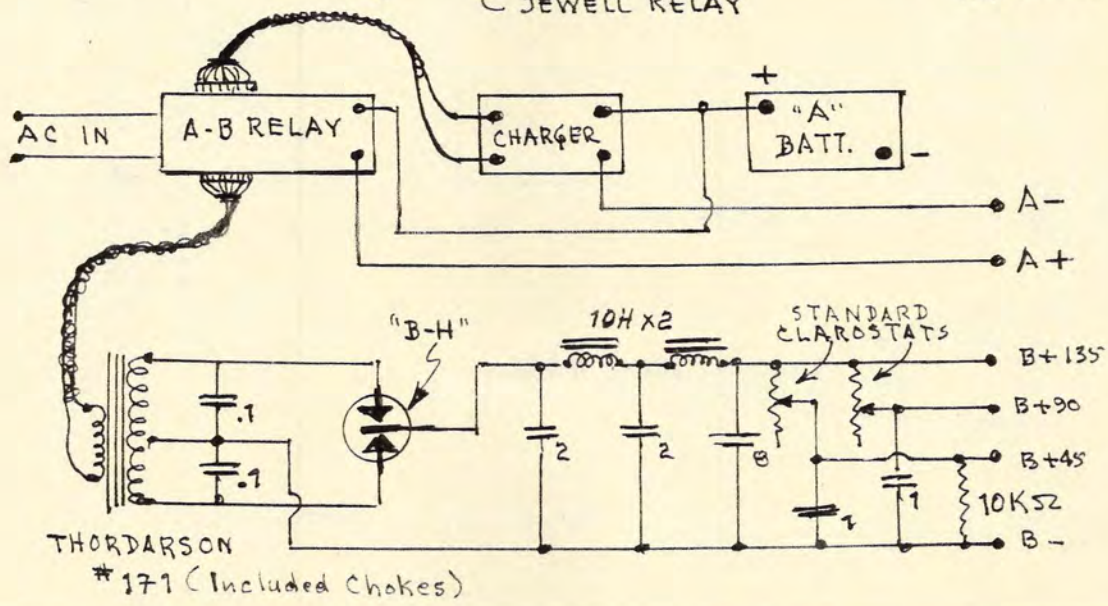
CAUTION: Do NOT ground A- or B- within supply unit for B-eliminator.



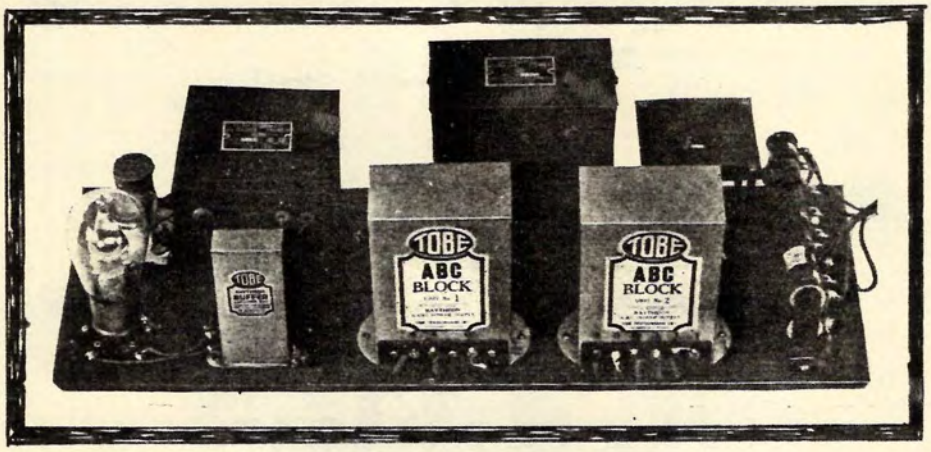
A "MODERN" C-BIAS SUPPLY

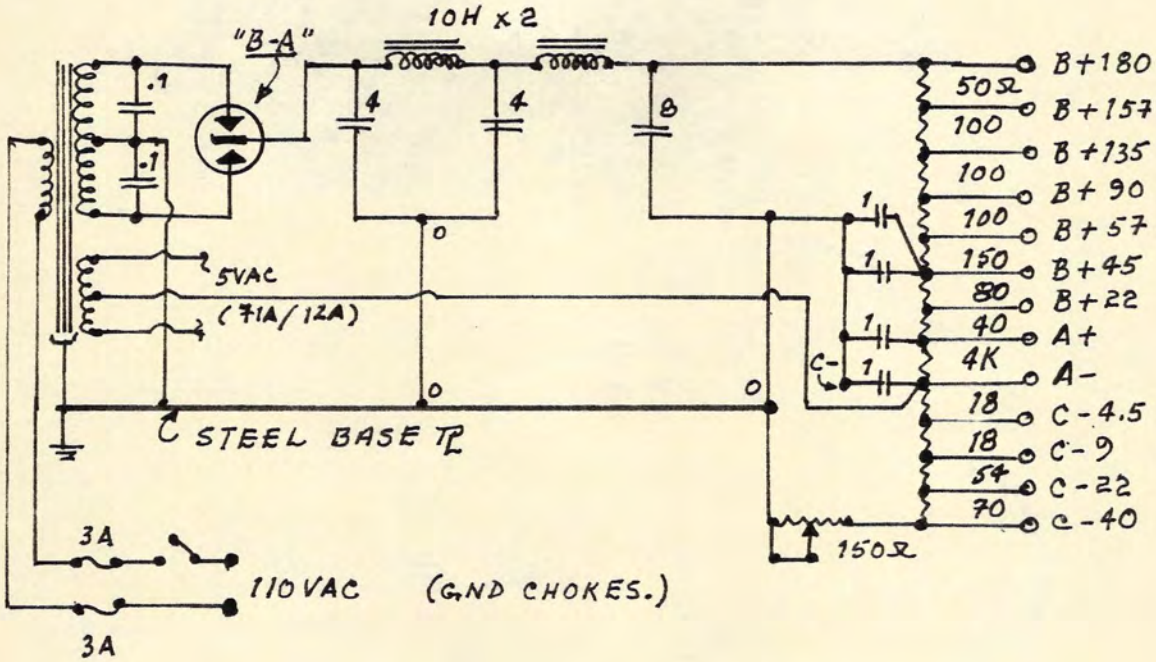
BEST's "QUADRAPHASE" POWER SUPPLY,'27

Gerald M. Best, like Arthur Lynch, had a penchant for never letting well-enough alone. Whenever a "new" circuit appeared, he would immediately set about to re-design it. As long-time technical editor for RADIO, he had ample opportunity to push his re-designs before the radio public. His most ambitious effort would have to be his 115 KC Super-Het, which was a variant of REMLER's 45 KC jobbie. His power supply for the ill-fated Quadraphase is depicted below; a conventional power supply for the time, and is adaptable to most any other set.



BEST's UNIVERSAL A-B-C ELIMINATOR, 1927

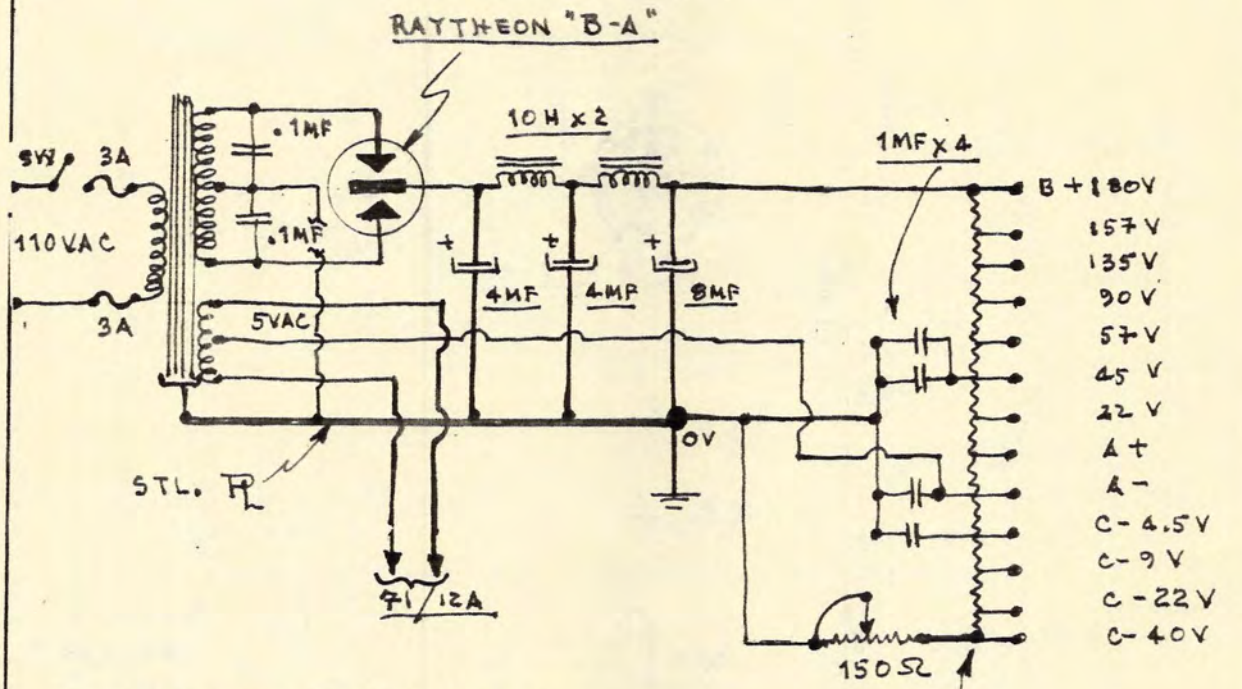




(R 7.27)

(See Over-Leaf For Additional Details.)

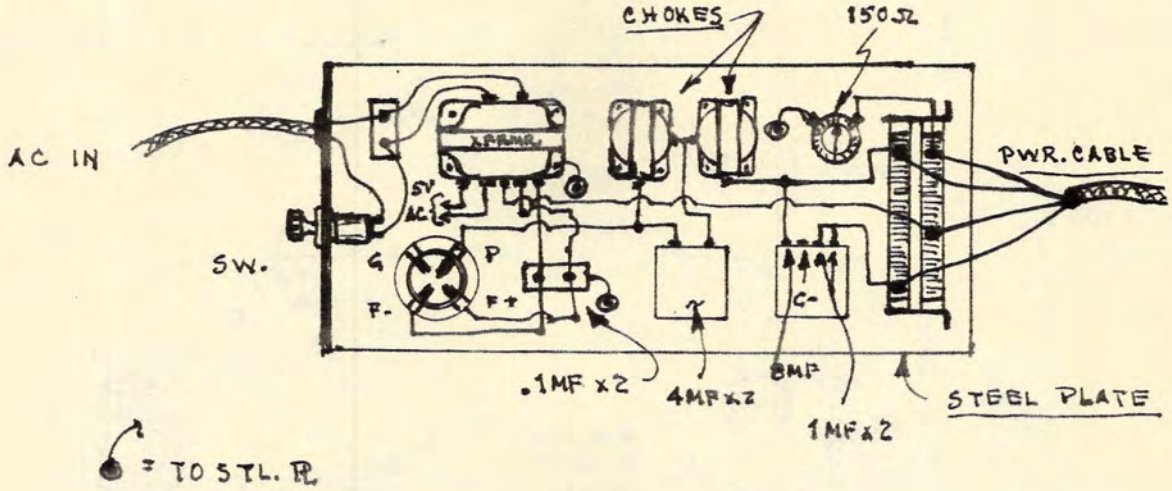
BEST's A-B-C BATTERY ELIMINATOR, 1927



PWR. XFRMR. = 700V SEC., C.T.
5V SEC., C.T.

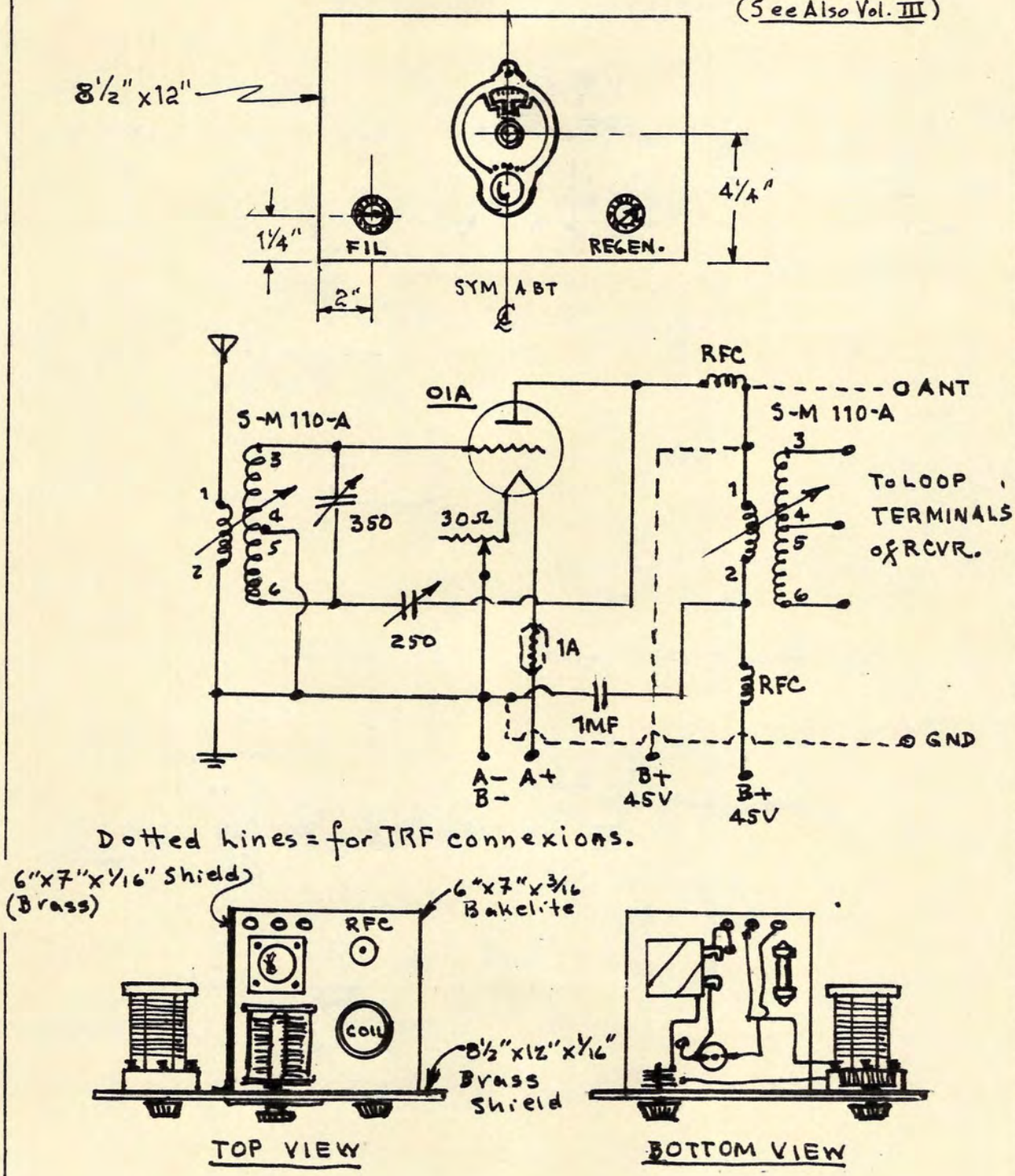
VOLTAGE DIVIDER
4,760 Ω TOTAL.

An efficient universal-type battery eliminator, to 125 mA.

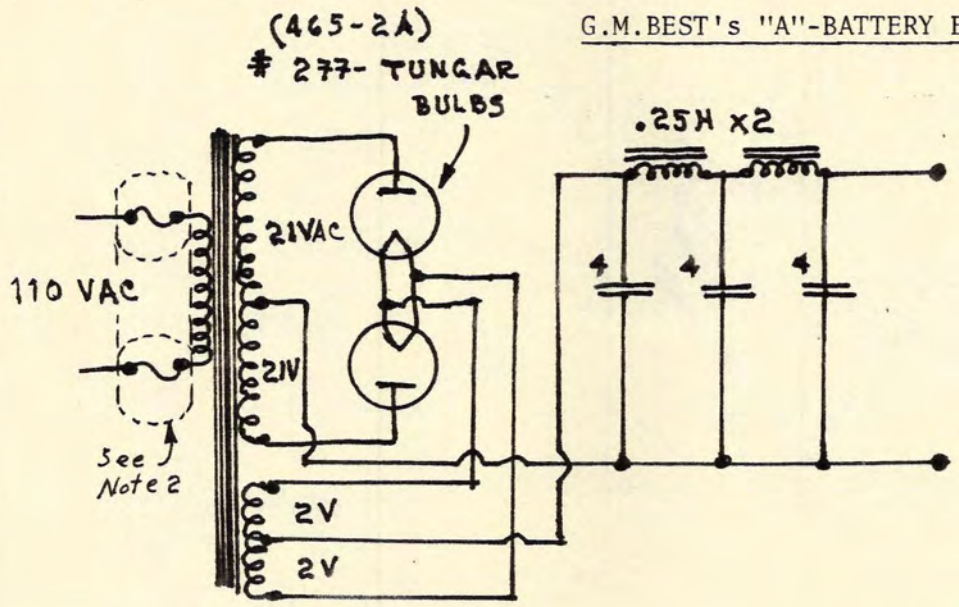


G.M.BEST's PRE-AMPLIFIER, 1926

(50-600 Meters)
(See Also Vol. III)

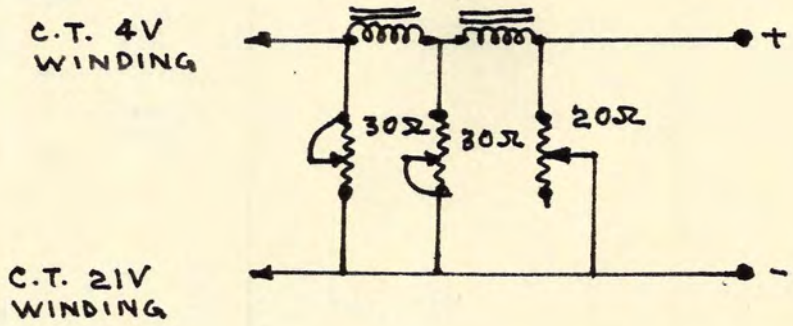


G.M.BEST's "A"-BATTERY ELIMINATOR,'27



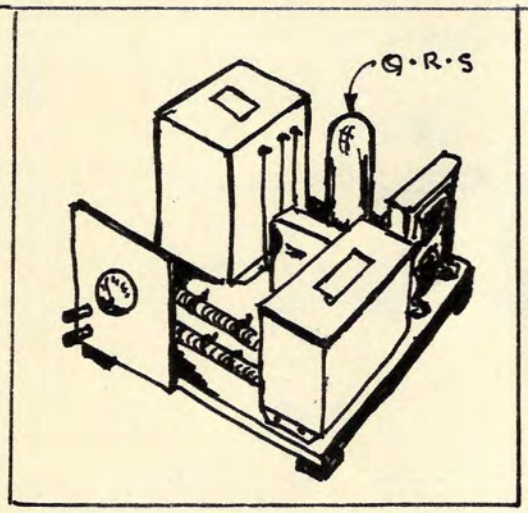
NOTES:
1. Tungar bulbs were the new type (for the time) - that is, they had a screw-base.
2. Fuse block was porcelain, dual sockets, 1A capacity, and with a screw-base.
3. Would operate up to (8) 01As; could hum with 99s.
4. Choke was AmerTran #418.

(BEST originally hand-wound his chokes and xfrmr; however, commercial items can be used, modified where required.)



RESISTOR-FILTER ALTERNATIVE

NOTES:
1. Amperites may be placed in series with each rheostat or pot. to check current flow.
2. Maximum current flow = 2A.
3. A resistance-filter is wasteful of current, but it does work, and was cheap to produce.



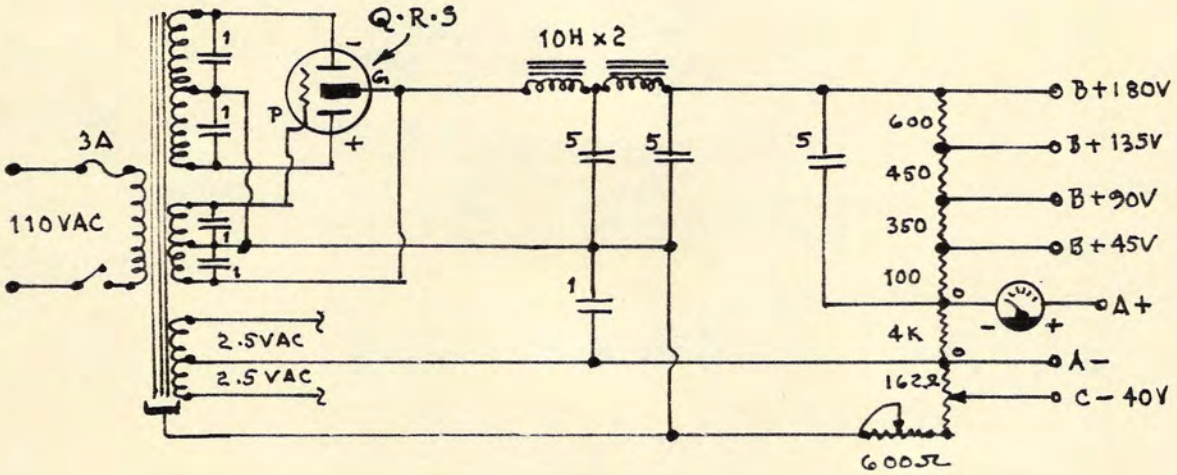
BODINE AC-6 POWER SUPPLY, 1927

Thordarson #2291 power xfrmr. and dual 10H chokes.
Q-R-S 400 mA rectifier tube.
300 mA meter, Jewell 135.
Q-R-S/Fast condenser block.
Q-R-S/Fast buffer block.
Carter Resistor Kit #401 - this was the Voltage Divider.

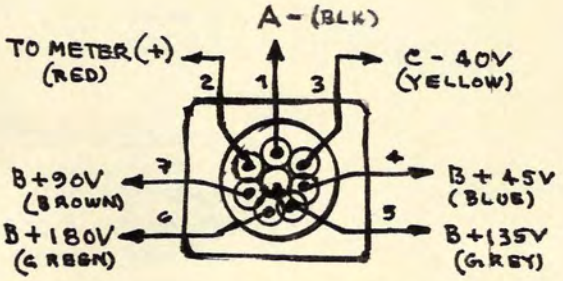
Panel = 7" x 7" x 3/16".
Baseboard = 13" x 14" x ½".
(2) Binding posts.

"Air-Gap" socket used for Q-R-S.
Power xfrmr. SEC = 600V, C.T.

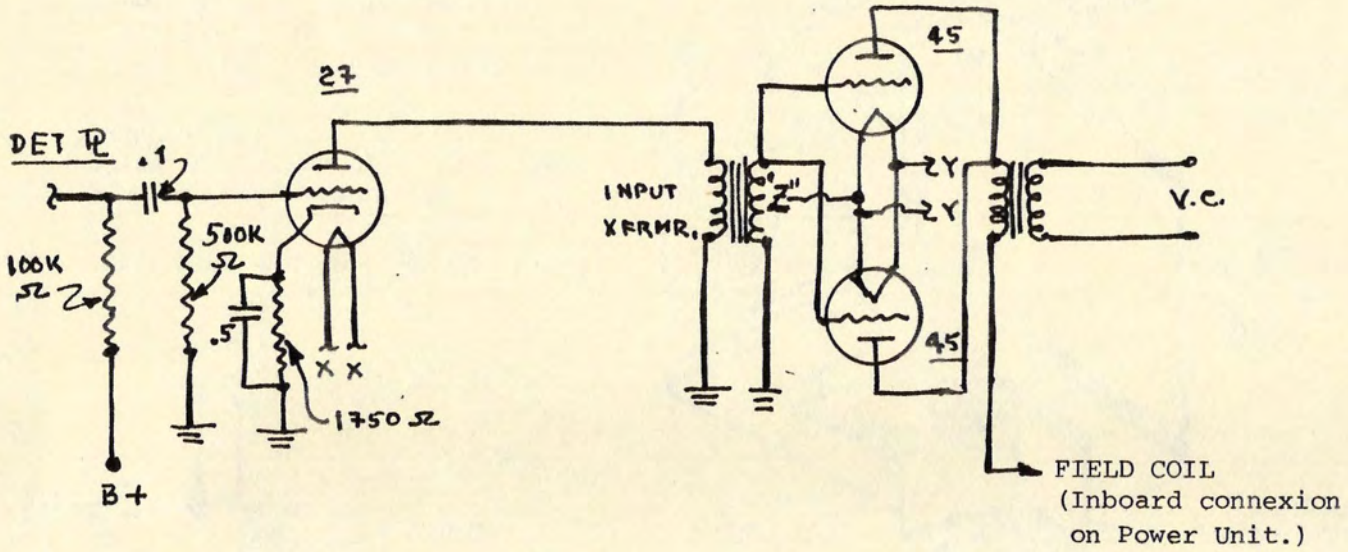
Q-R-S was a tubular configur.



ORIGINAL CABLE CONNEXIONS

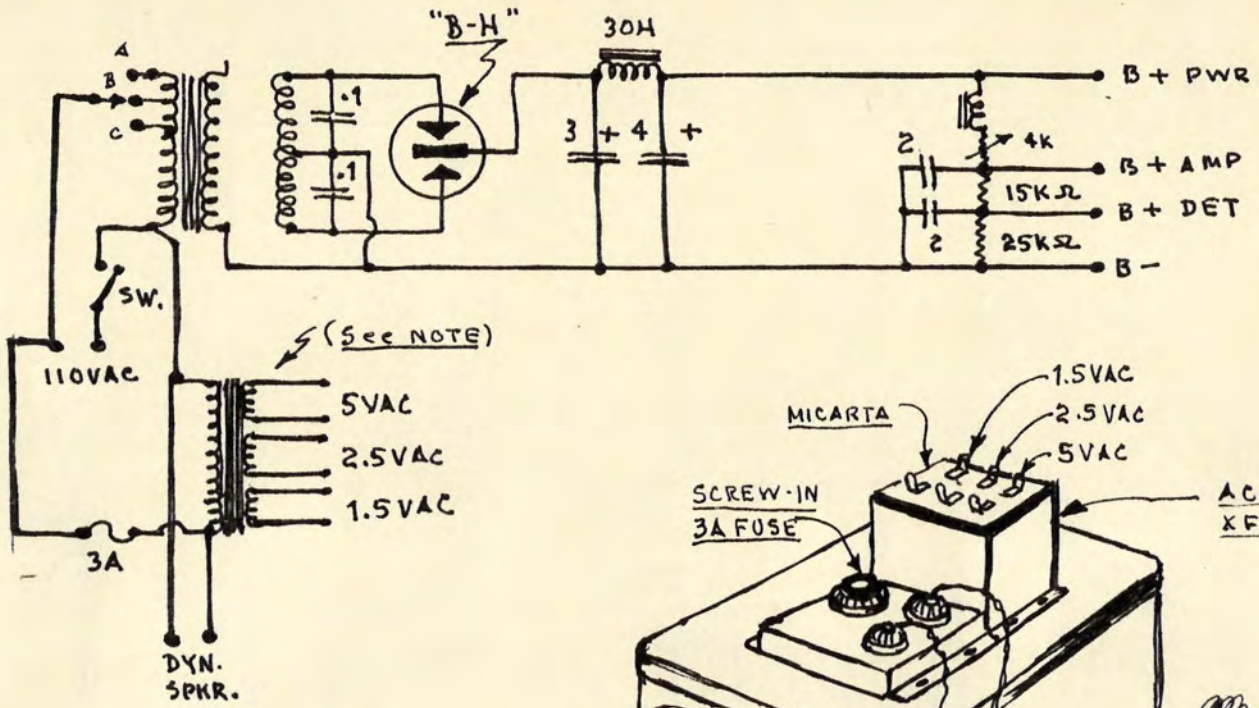


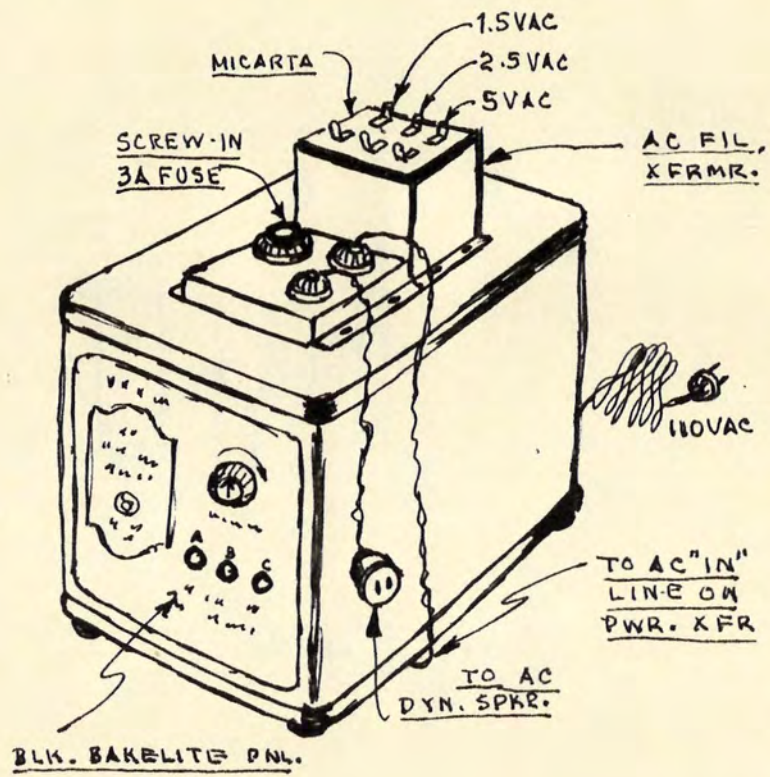
(CB 9-27)



"Z" = to free end of 45's grid bias (650 ohms) on Power Unit.

BALKITE MODEL "F" AF AMPLIFIER
(1927)





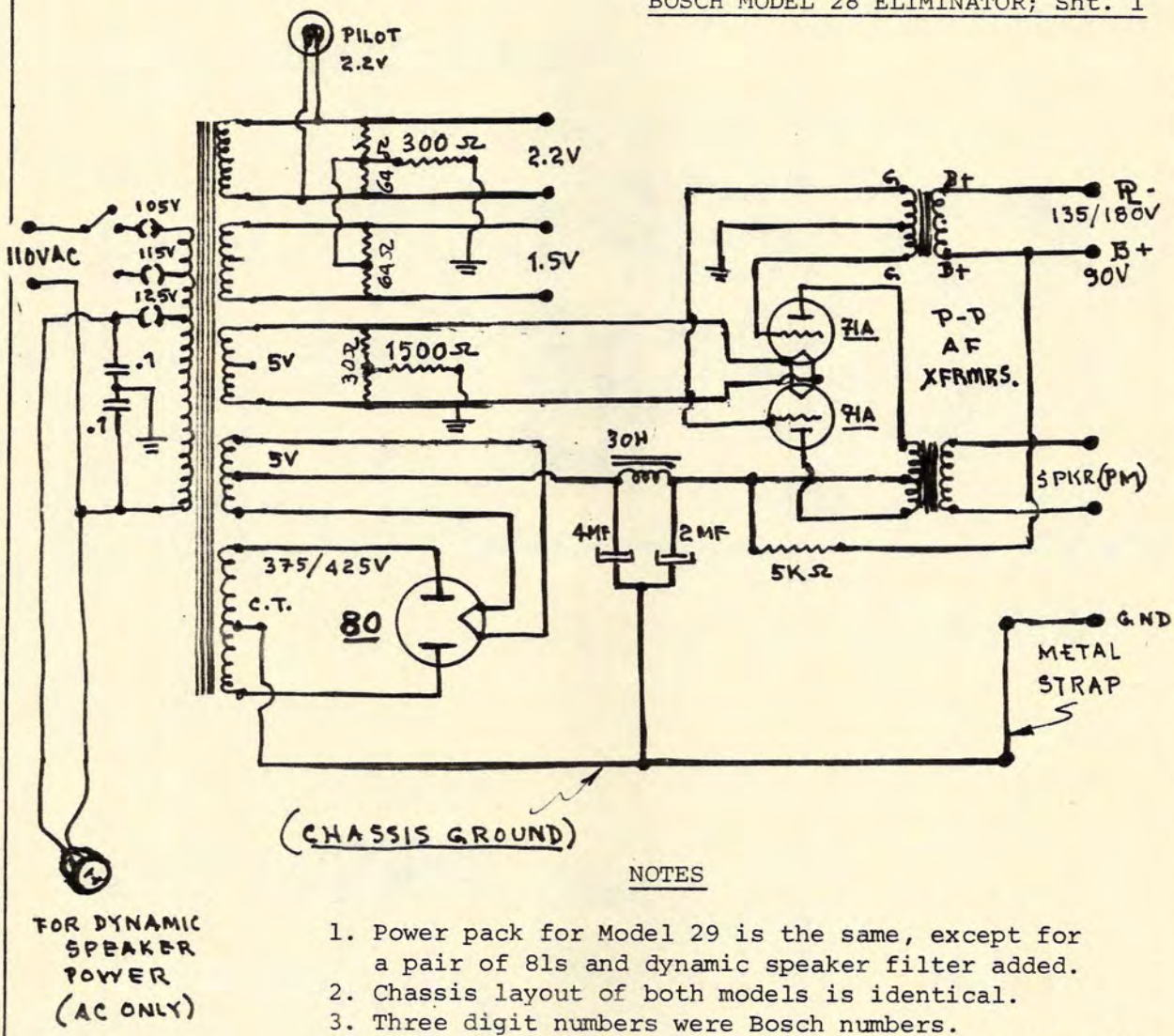
BOSCH "NOBATTERY" MODEL 503 ELIMINATOR, '26

NOTES:

1. Models 501 and 502 are the same as this model, except that they were offered without the AC FIL xfrmr, fuse, and dynamic speaker receptacle.

2. The 500-series "Nobattery" by Bosch differ from their other eliminators in having an extra winding on the power xfrmr.

BOSCH MODEL 28 ELIMINATOR; Sht. 1

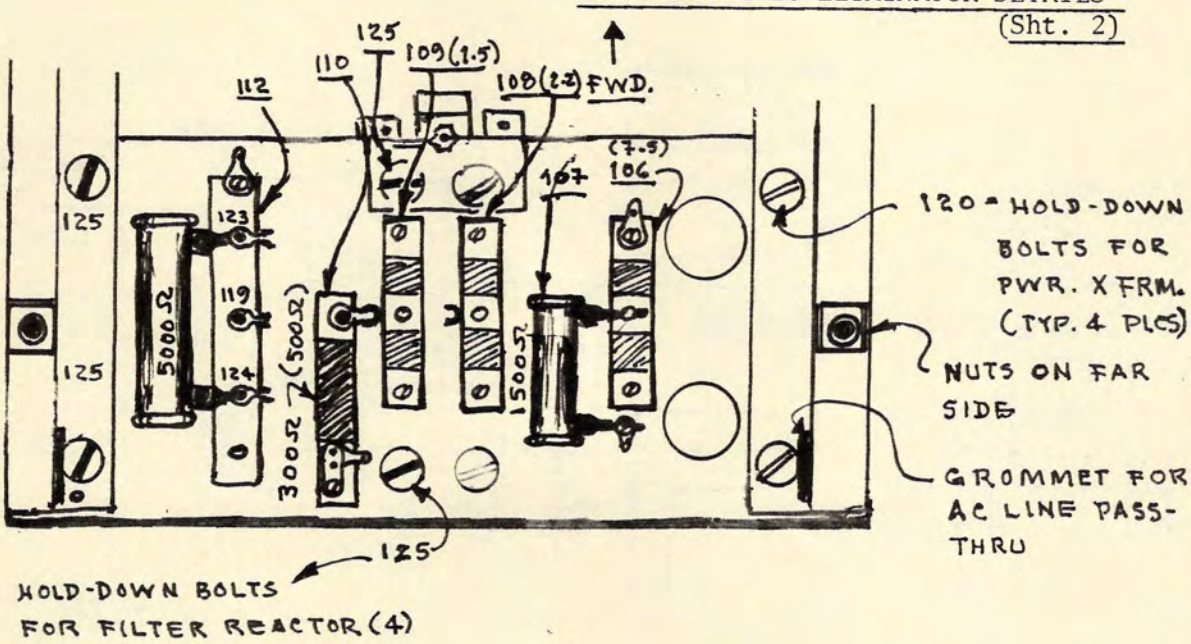


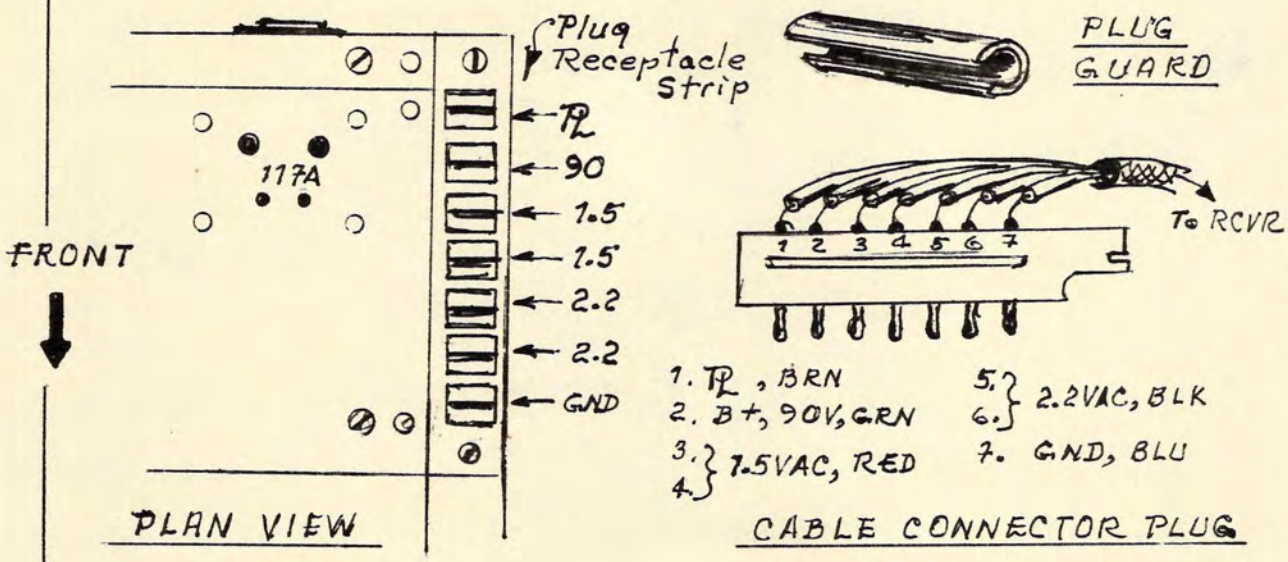
FOR DYNAMIC SPEAKER POWER (AC ONLY)

NOTES

1. Power pack for Model 29 is the same, except for a pair of 81s and dynamic speaker filter added.
2. Chassis layout of both models is identical.
3. Three digit numbers were Bosch numbers.
4. Filter Wire Colour Code: Black Fabric = to 119 & 122. Black - to 199. Blue = to 123. Red = to 122.
5. Power Xfrmr. Wire Colour Code: Green = GND. Single Black = to 119 of 112 C.T. Brown = to large holes of socket 14, along with twisted brown wire to 80 tube. Single Brown = to 1 main switch leads (17). Black w/ Red Trace = to tap switch 105. Black = to tap switch 115. Black w/ Yellow Trace = to tap switch 125. Blue = 5V winding. Black = 2.2V winding. Red = 1.5V to the two end terminals of 106, 108, 109.
6. Refer to Sheet 2 for part number placement.

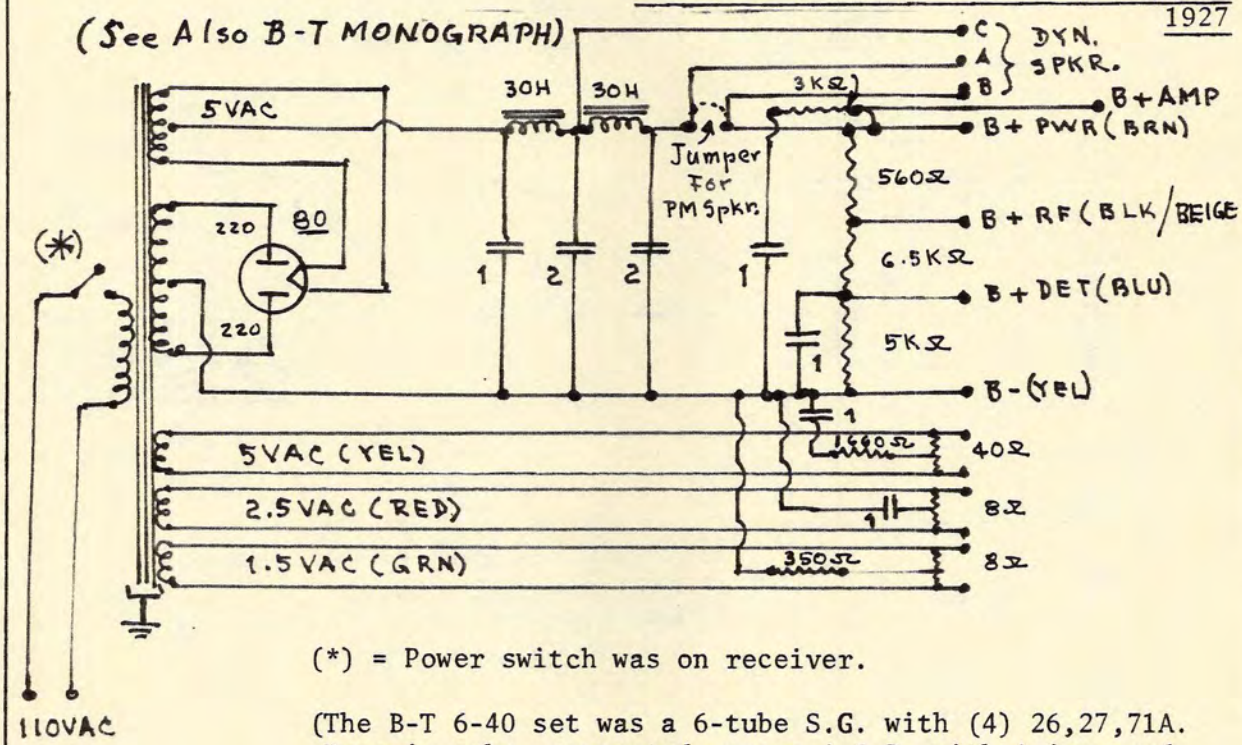
BOSCH MODEL 28 ELIMINATOR DETAILS
(Sht. 2)





BREMER-TULLY "6-40" POWER SUPPLY, 1926 1927

(See Also B-T MONOGRAPH)

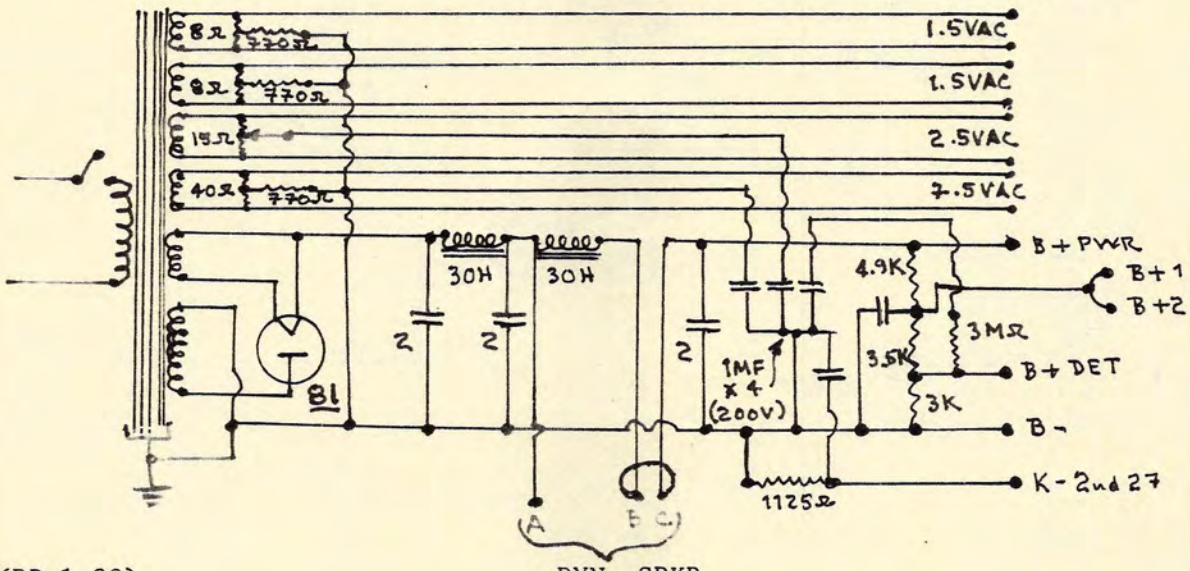


(*) = Power switch was on receiver.

(The B-T 6-40 set was a 6-tube S.G. with (4) 26,27,71A. Dynamic spkr. connected across A & B, with A jumpered to C, to short second choke.)

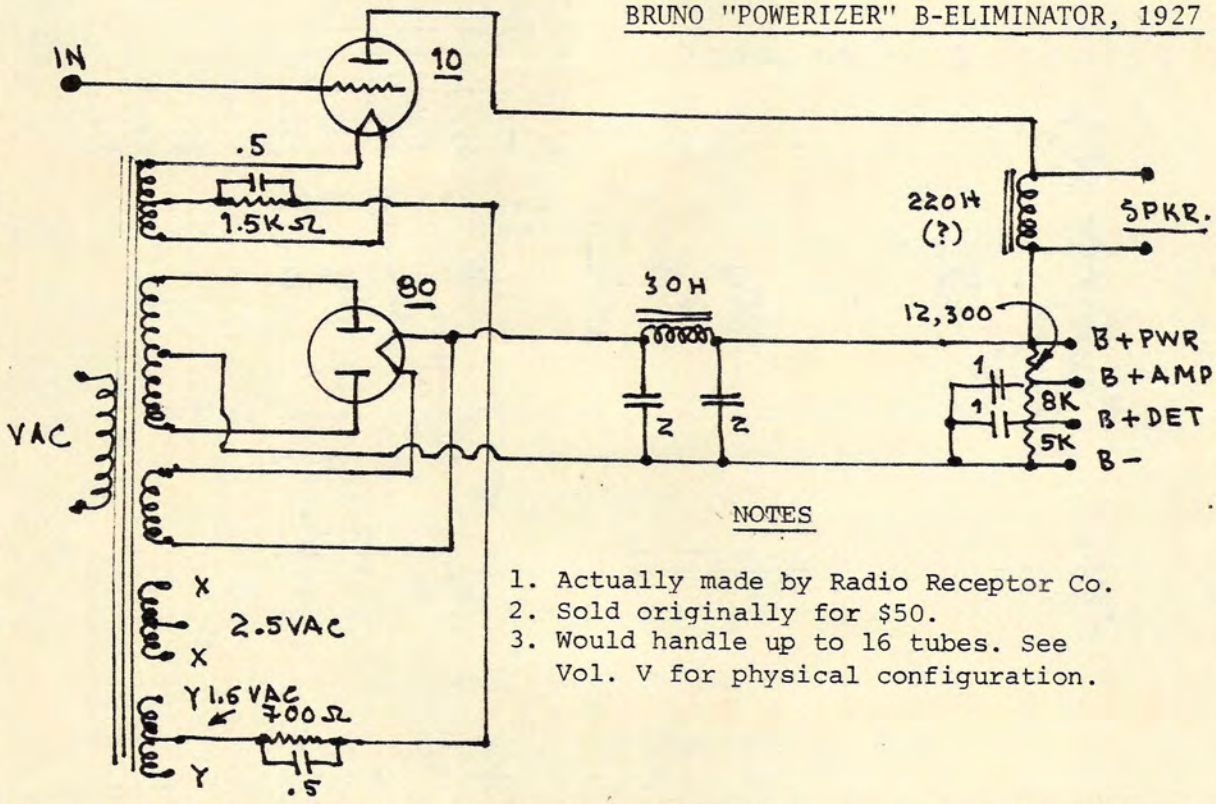
(See Also B-T MONOGRAPH.)

BREMER-TULLY "8-20" POWER SUPPLY (1929) (See Also "8-20-A")



(RB 1-29)

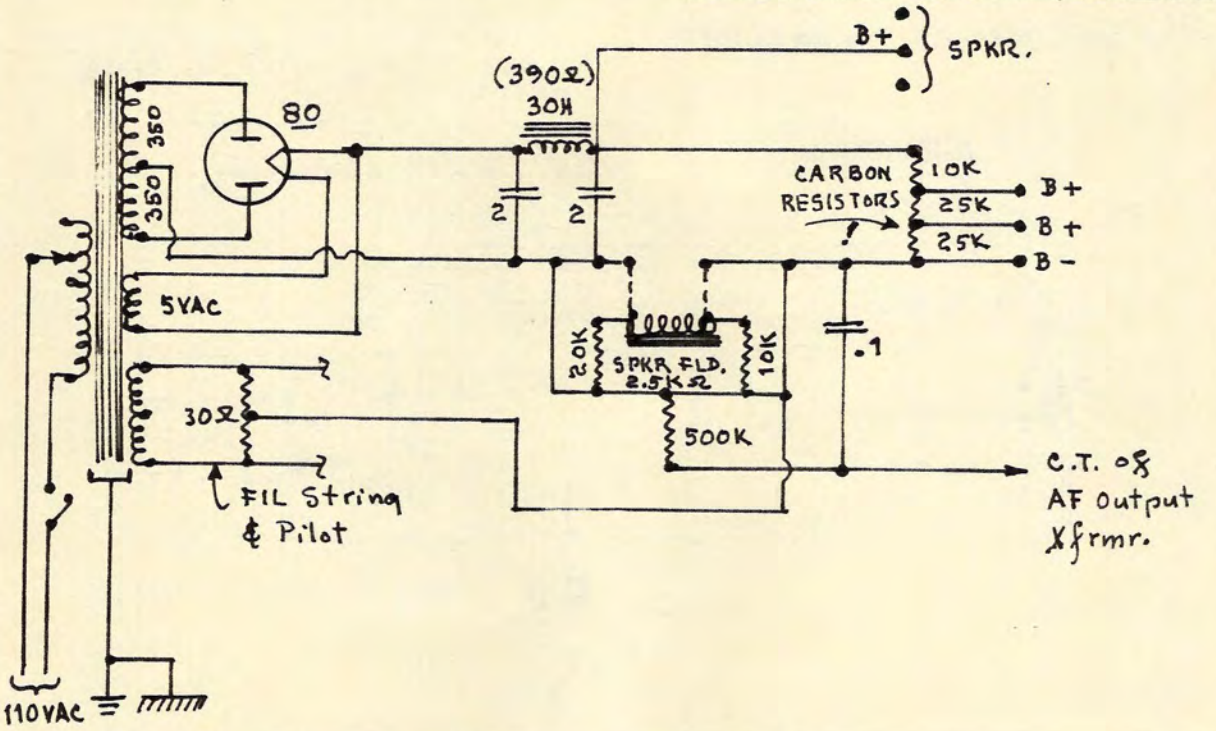
BRUNO "POWERIZER" B-ELIMINATOR, 1927



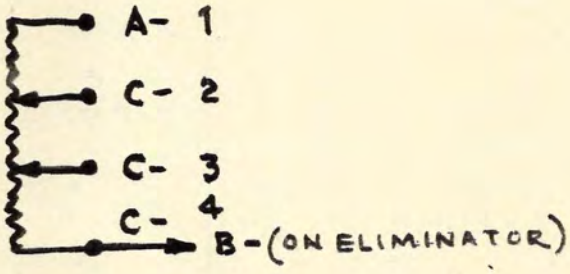
NOTES

1. Actually made by Radio Receptor Co.
2. Sold originally for $50.
3. Would handle up to 16 tubes. See Vol. V for physical configuration.

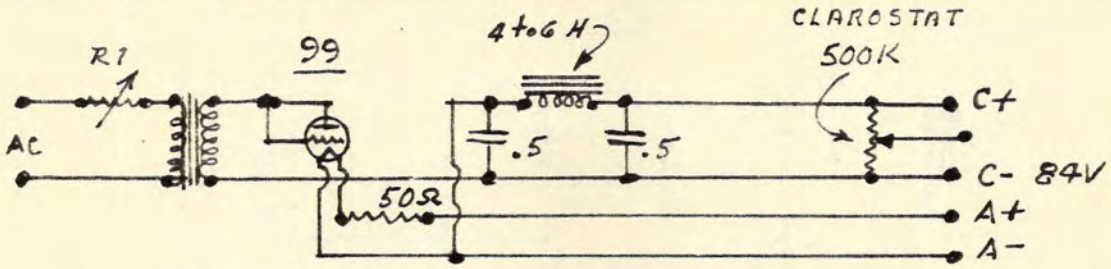
BALDWIN MODEL 80 POWER SUPPLY,'29



C-BIAS SUPPLY NOTES; 1925/1926/1927



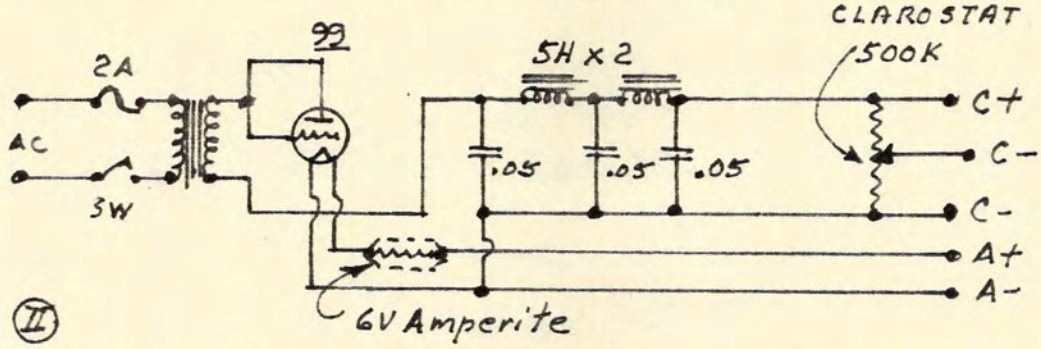
MULTIPLE SLIDER WIRE-WOUND POT. 2K-Ohms:Current Capacity = 45V, 25 mA.



R1 = 10K ω/1:1 xfrmr.
25K ω/1:2 xfrmr.

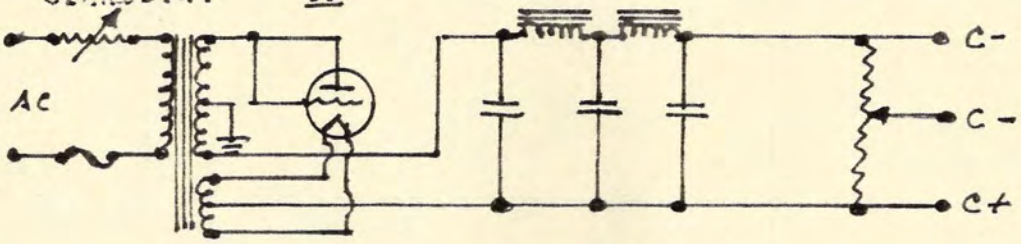
Choke may be the SEC of any AF xfrmr., or PRI & SEC connected in series.

(I)

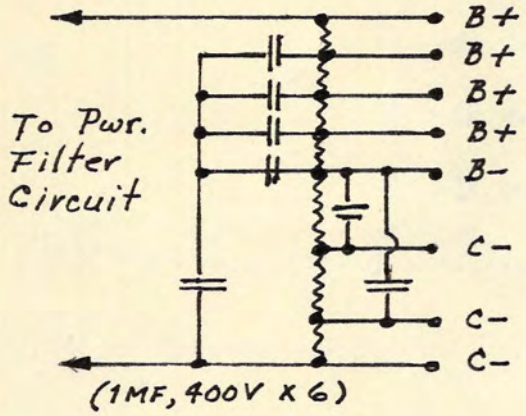


(II)

ALTERNATE CIRCUIT

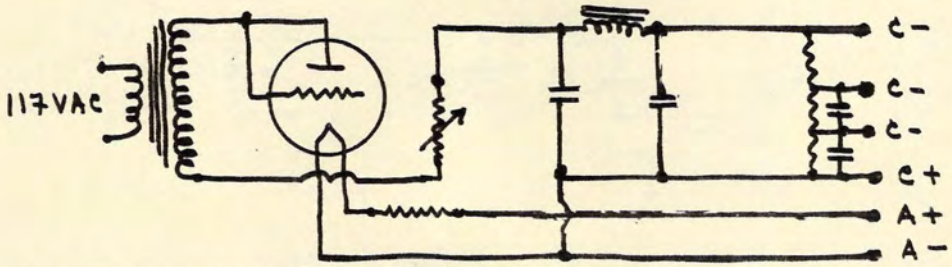


C-BIAS SUPPLY NOTES: 1925/1926/1927
(Sht. 2)



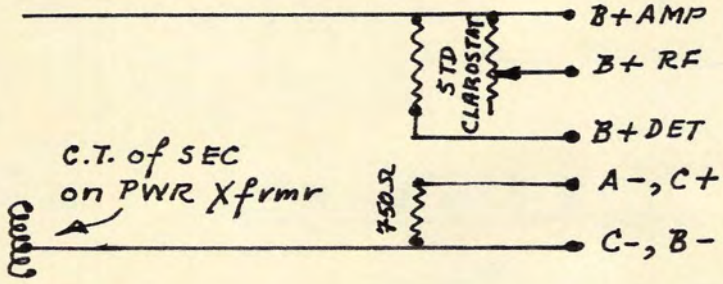
Capacitors may be 0.5 MFD if C-Bias supply only is used.

All other values conventional for the time.

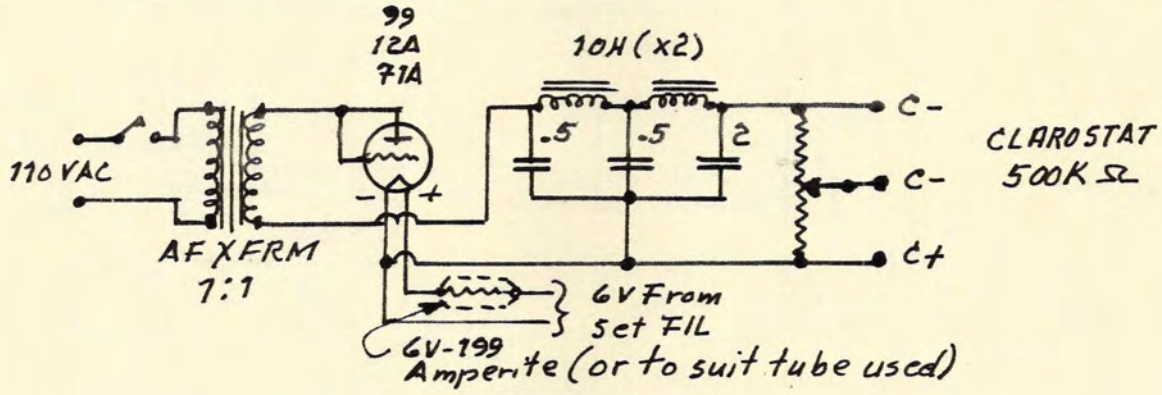


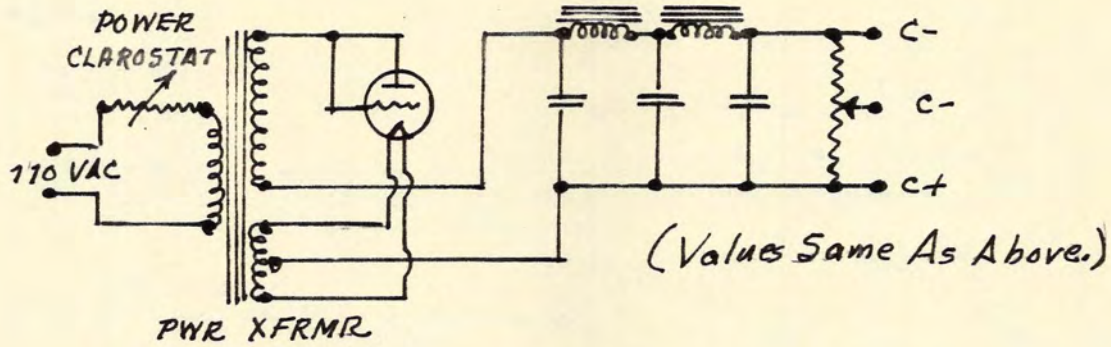
Total voltage drop = highest bias.
Use any tube - e.g., 99,26,27,01A.
If output xfrmr. voltage is too high, insert a rheostat.

C-BIASING METHOD IN COMBINED A-B-C UNITS

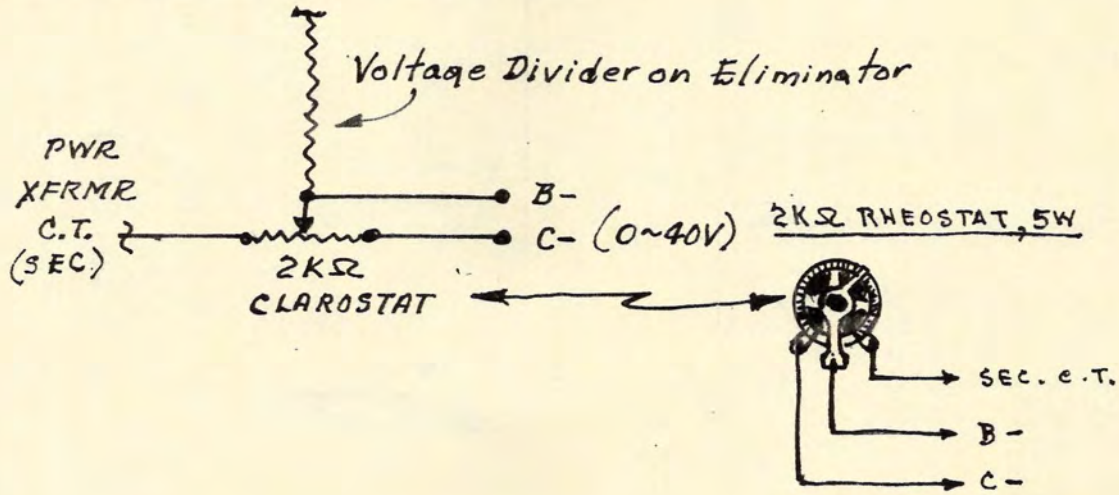


C-BATTERY ELIMINATORS OF 1928

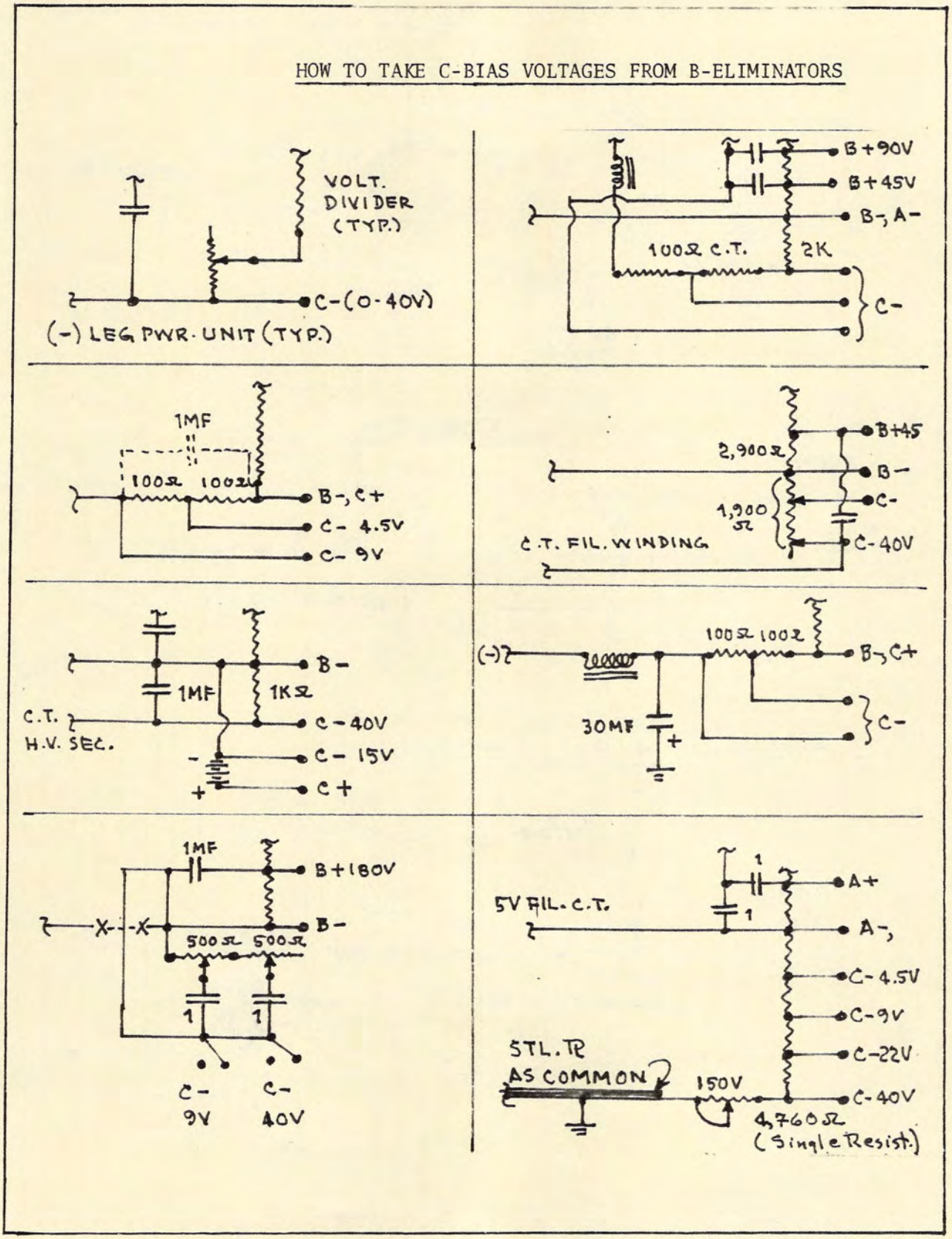




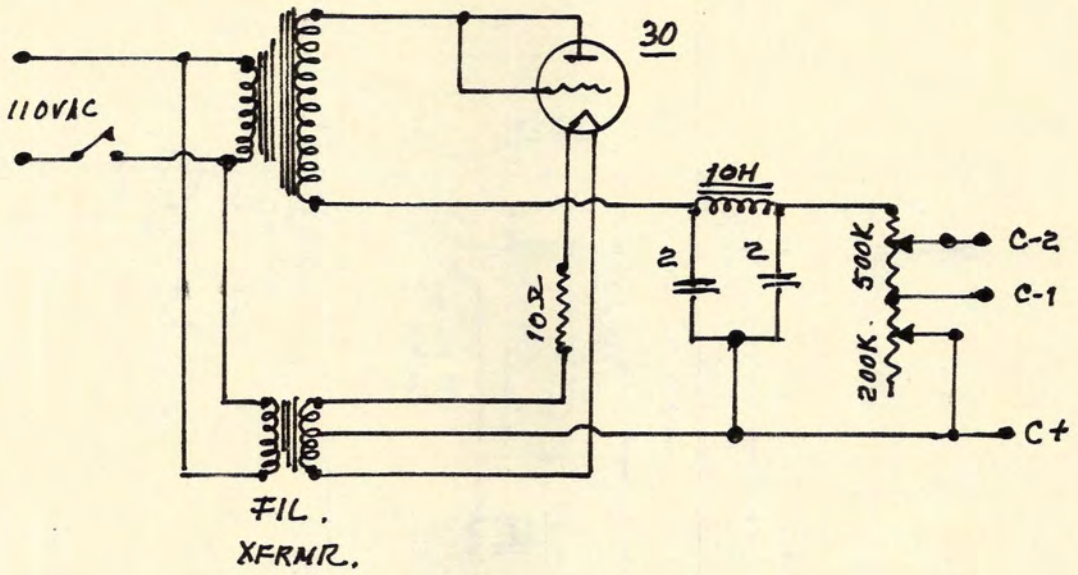
C-BIAS FROM A B-ELIMINATOR:

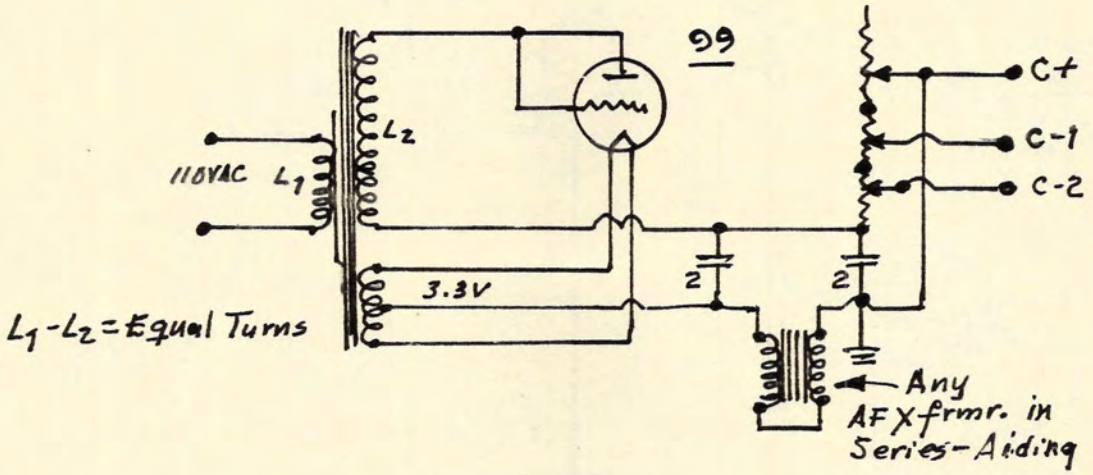


HOW TO TAKE C-BIAS VOLTAGES FROM B-ELIMINATORS

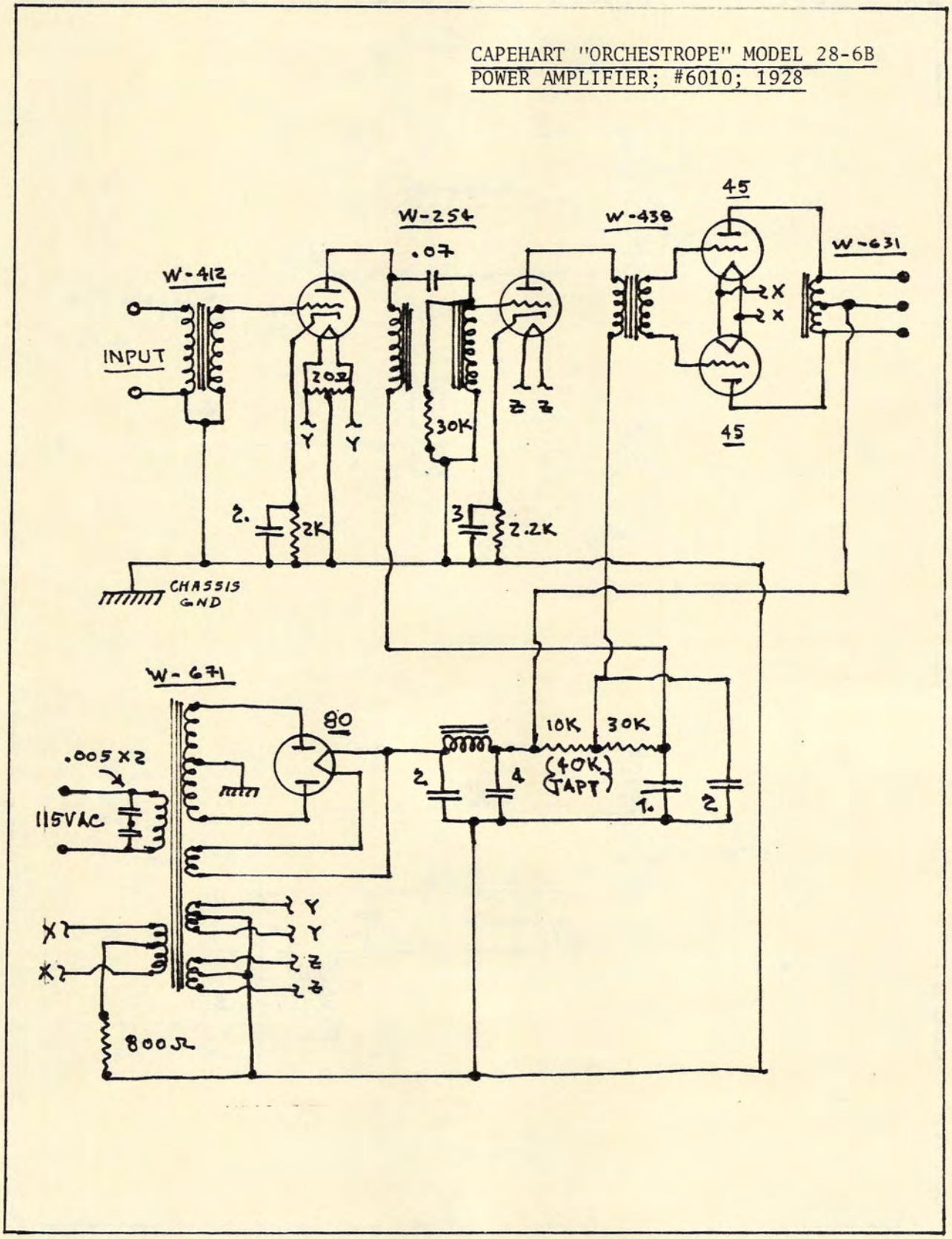


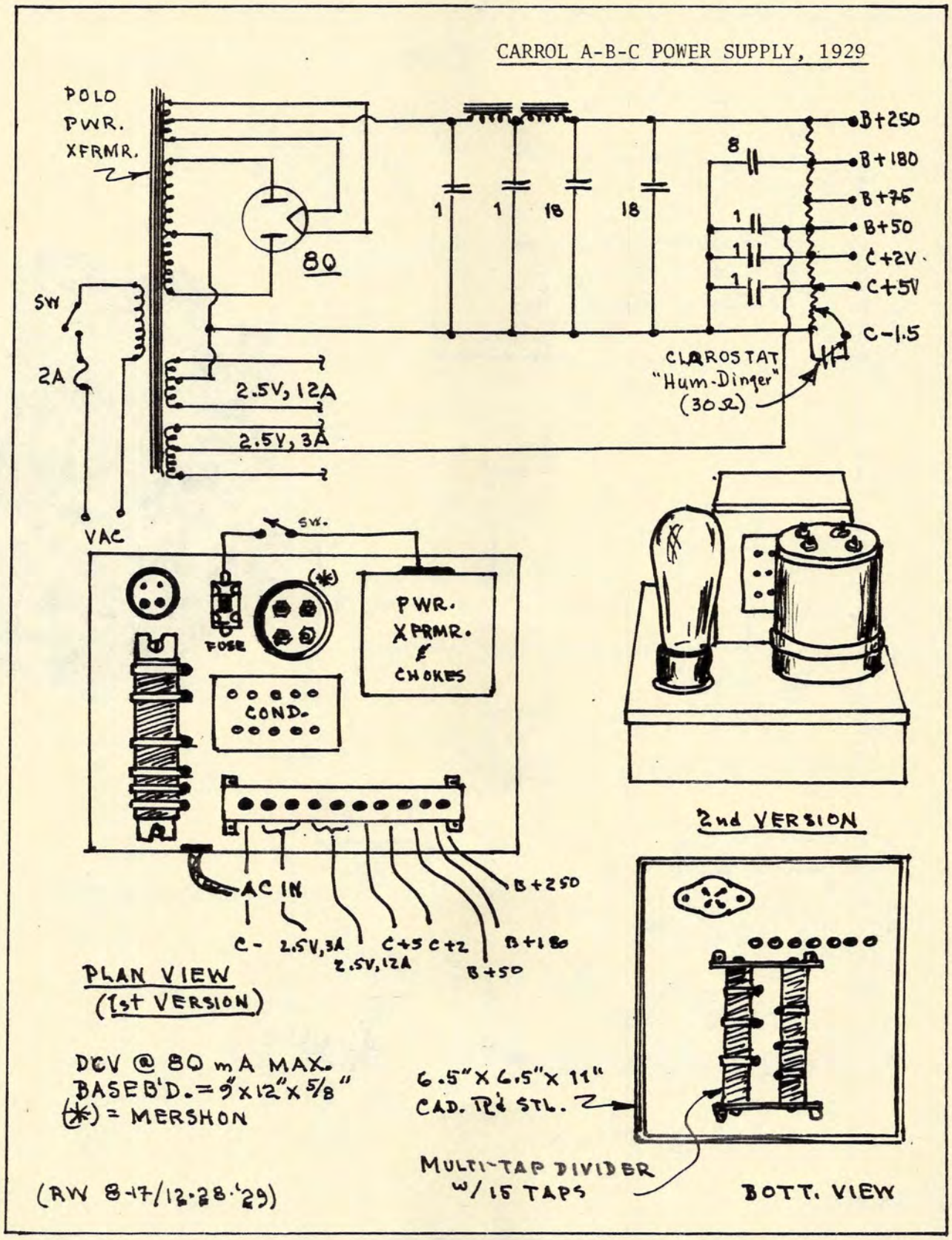
SEPERATE "C"-SUPPLIES FOR AC SETS

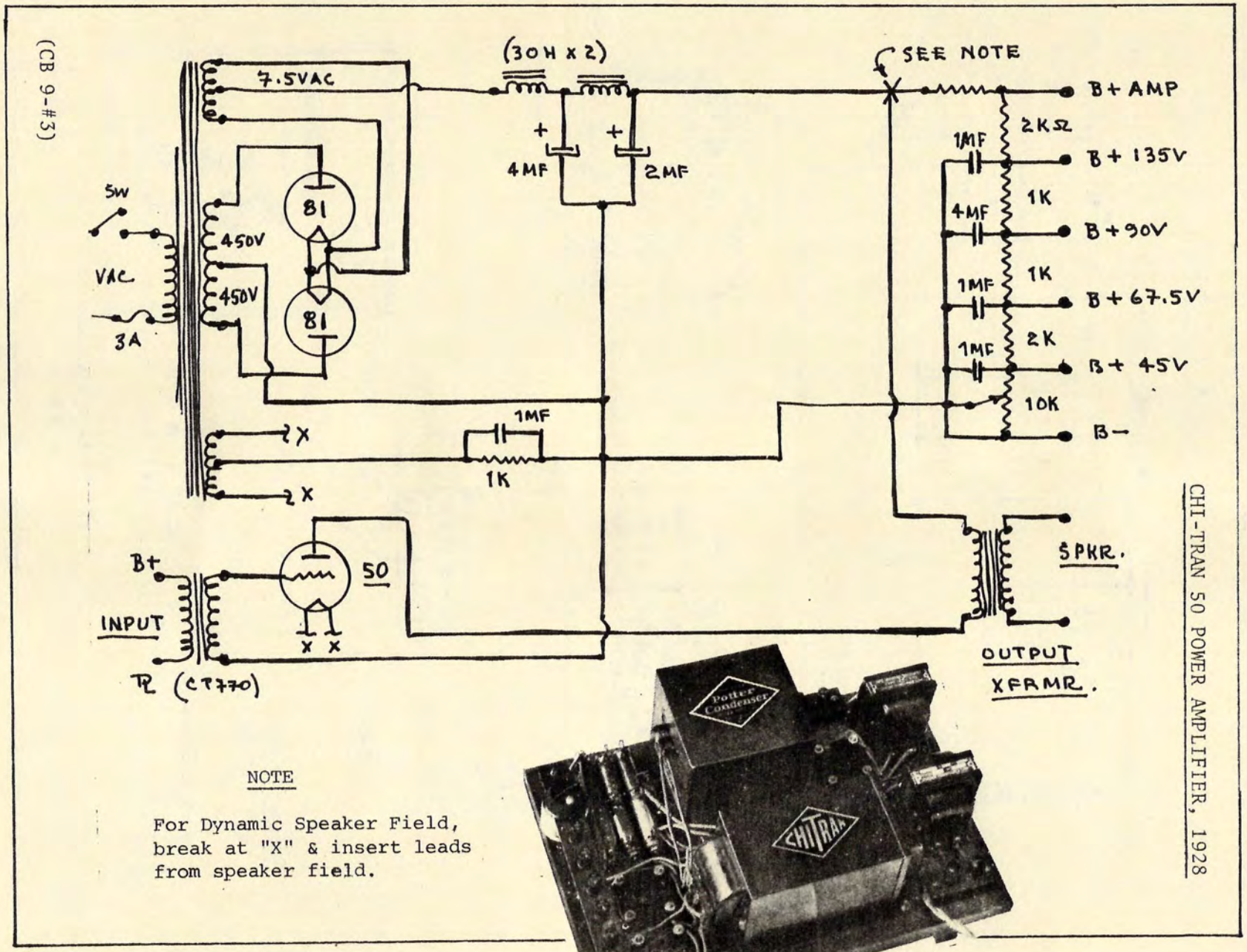




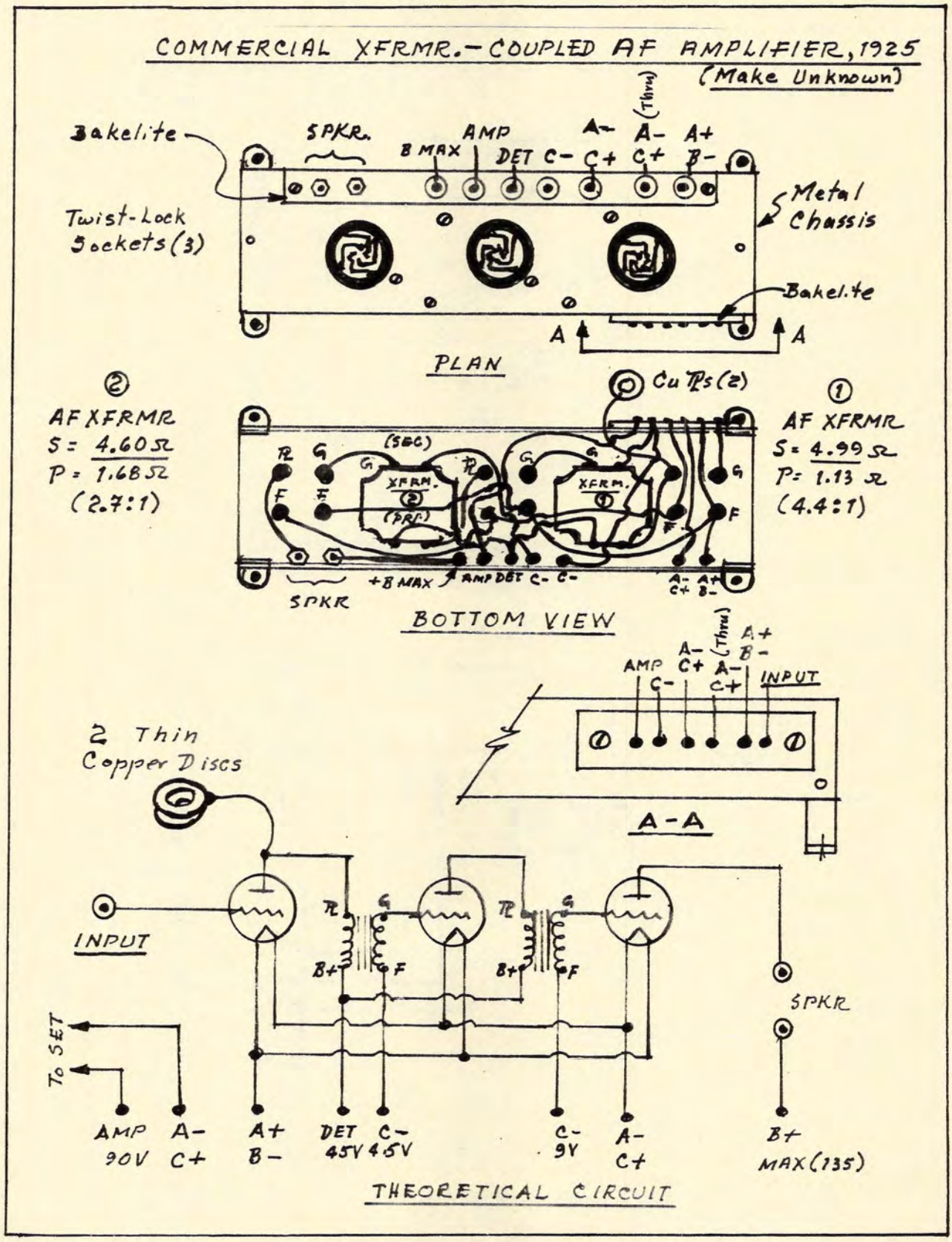
CAPEHART "ORCHESTROPE" MODEL 28-6B
POWER AMPLIFIER; #6010; 1928



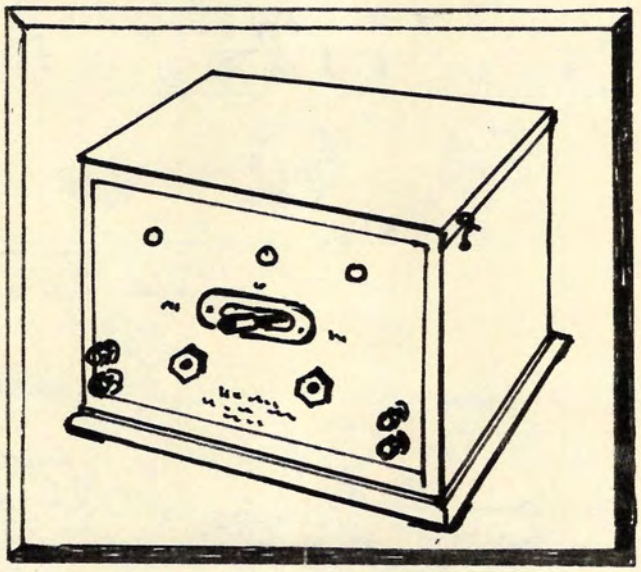

CARROL A-B-C POWER SUPPLY, 1929
POLO PWR. XFRMR.
80
SW
2A
VAC
2.5V, 12A
2.5V, 3A
1
1
18
18
8
1
1
1
B+250
B+180
B+75
B+50
C+2V
C+5V
C-1.5
CLAROSTAT "Hum-Dinger" (30Ω)
SW.
FUSE
(*)
PWR. XFRMR. & CHOKES
COND.
AC IN
C-
2.5V,3A
2.5V,12A
C+5
C+2
B+50
B+180
B+250
PLAN VIEW (1st VERSION)
2nd VERSION
DCV @ 80 mA MAX.
BASEB'D. = 9"x12"x 5/8"
(*) = MERSHON
6.5"X 6.5"X 11"
CAD. TR'd STL.
MULTI-TAP DIVIDER w/15 TAPS
BOTT. VIEW
(RW 8-17/12-28-'29)

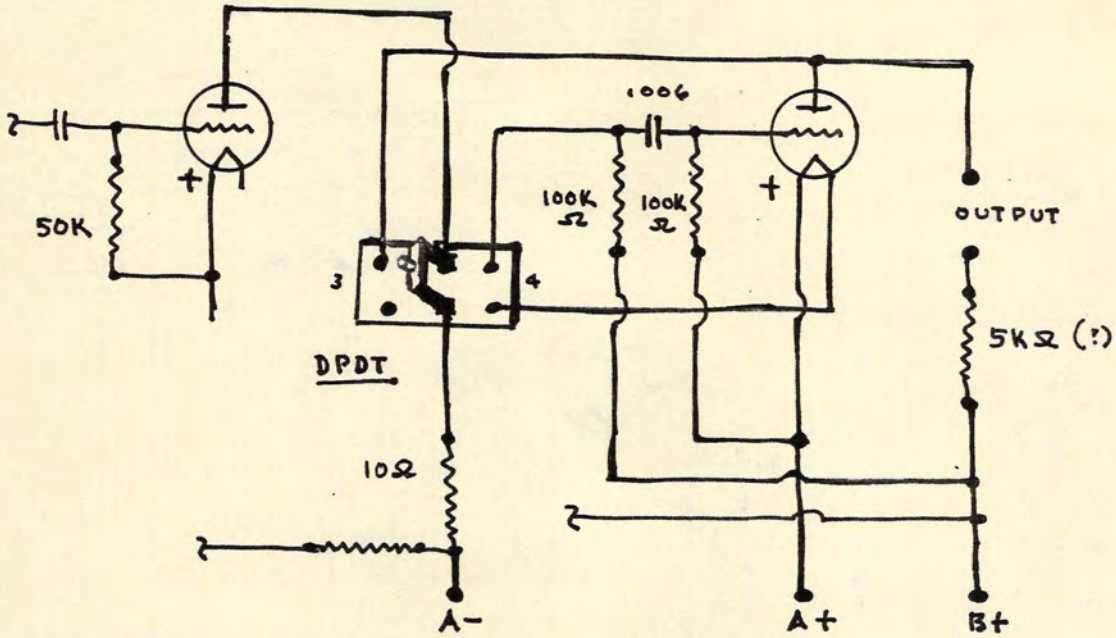


CHI-TRAN 50 POWER AMPLIFIER, 1928


COMMERCIAL XFRMR.-COUPLED AF AMPLIFIER, 1925
(Make Unknown)
Bakelite
SPKR.
B MAX
AMP
DET
C-
C+
A-
A- (Thru)
C+
A+
B-
Twist-Lock Sockets (3)
Metal Chassis
Bakelite
A
A
PLAN
② AF XFRMR
S = 4.60 Ω
P = 1.68 Ω
(2.7:1)
Cu Tps (2)
① AF XFRMR
S = 4.99 Ω
P = 1.13 Ω
(4.4:1)
(SEC)
XFRM. ②
(PRI.)
XFRM. ①
SPKR
+B MAX
AMP DET C- C-
A- A+
C+ B-
BOTTOM VIEW
AMP
C-
A-
C+
A- (Thru)
C+
A+
B-
INPUT
A-A
2 Thin Copper Discs
INPUT
B+
F
B+
F
SPKR
To SET
AMP 90V
A- C+
A+ B-
DET 45V
C- 45V
C- 9V
A- C+
B+ MAX (135)
THEORETICAL CIRCUIT

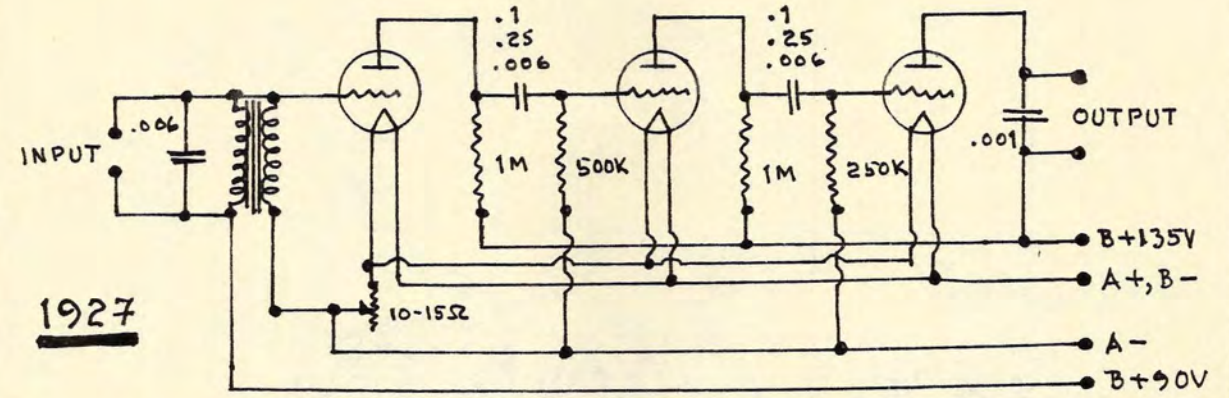
DAVEN DELUXE AF APLIFIER UNIT, 1924
(Supplied With Type 3-C Kit.)



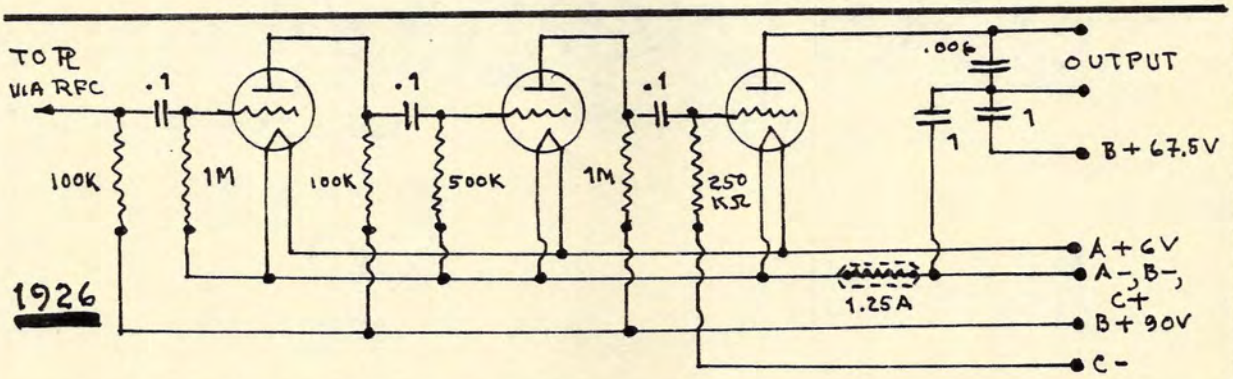


When this AF amplifier is used, a 16-A tube should be in the output stage of the tuner.

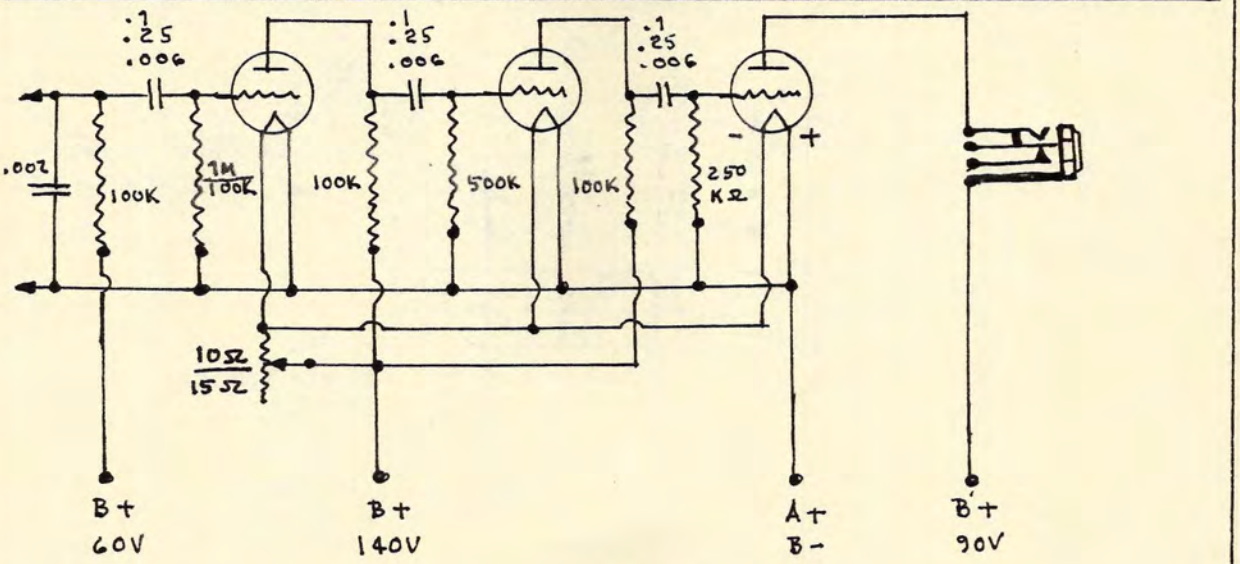
EVOLUTION OF THE DAVEN RESISTANCE-COUPLED AMPLIFIER



1927



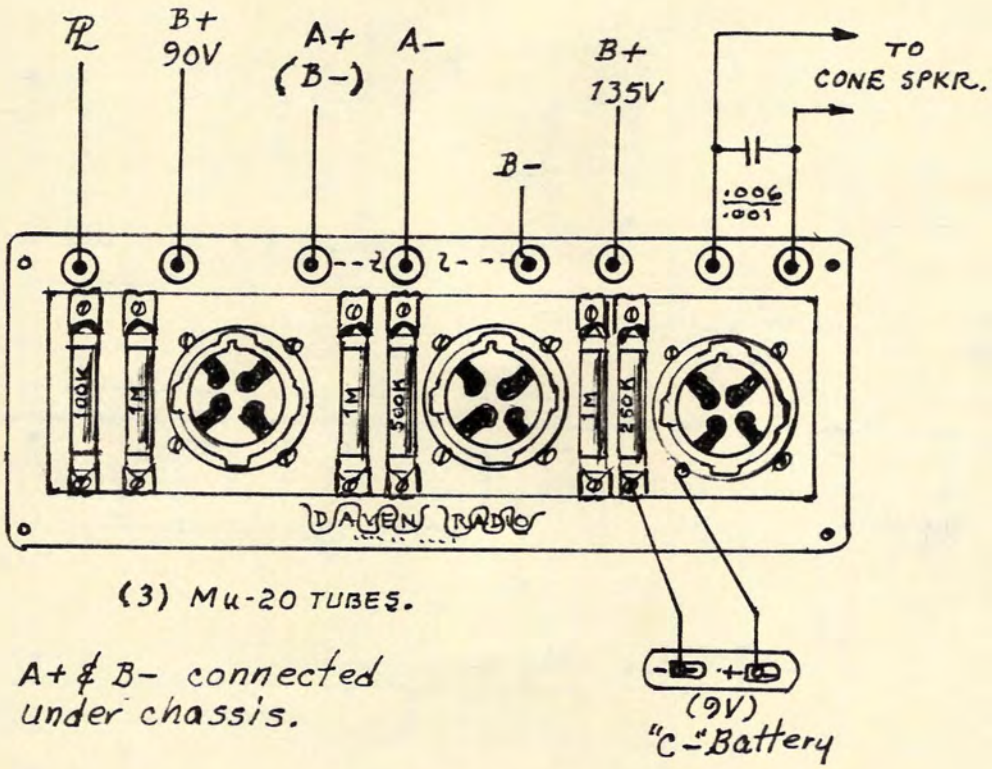
1926

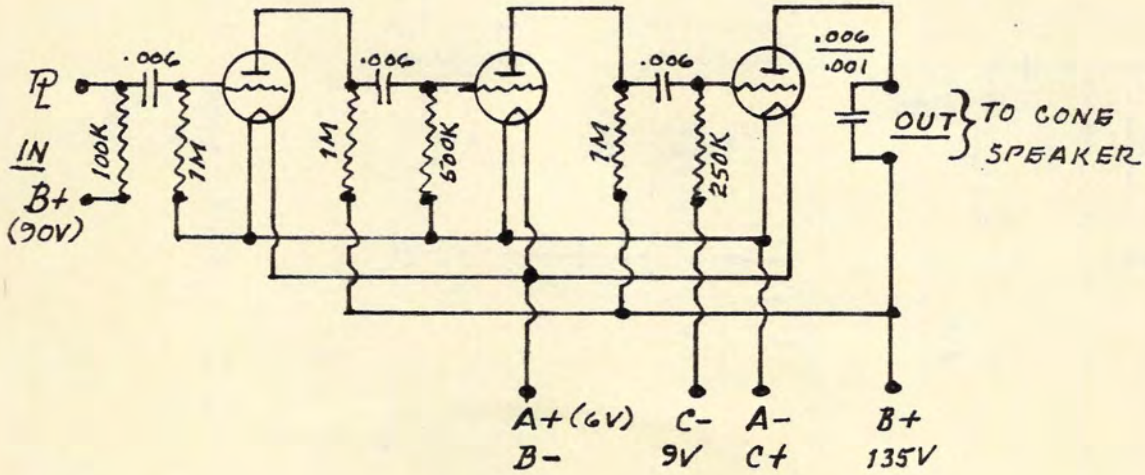


1925

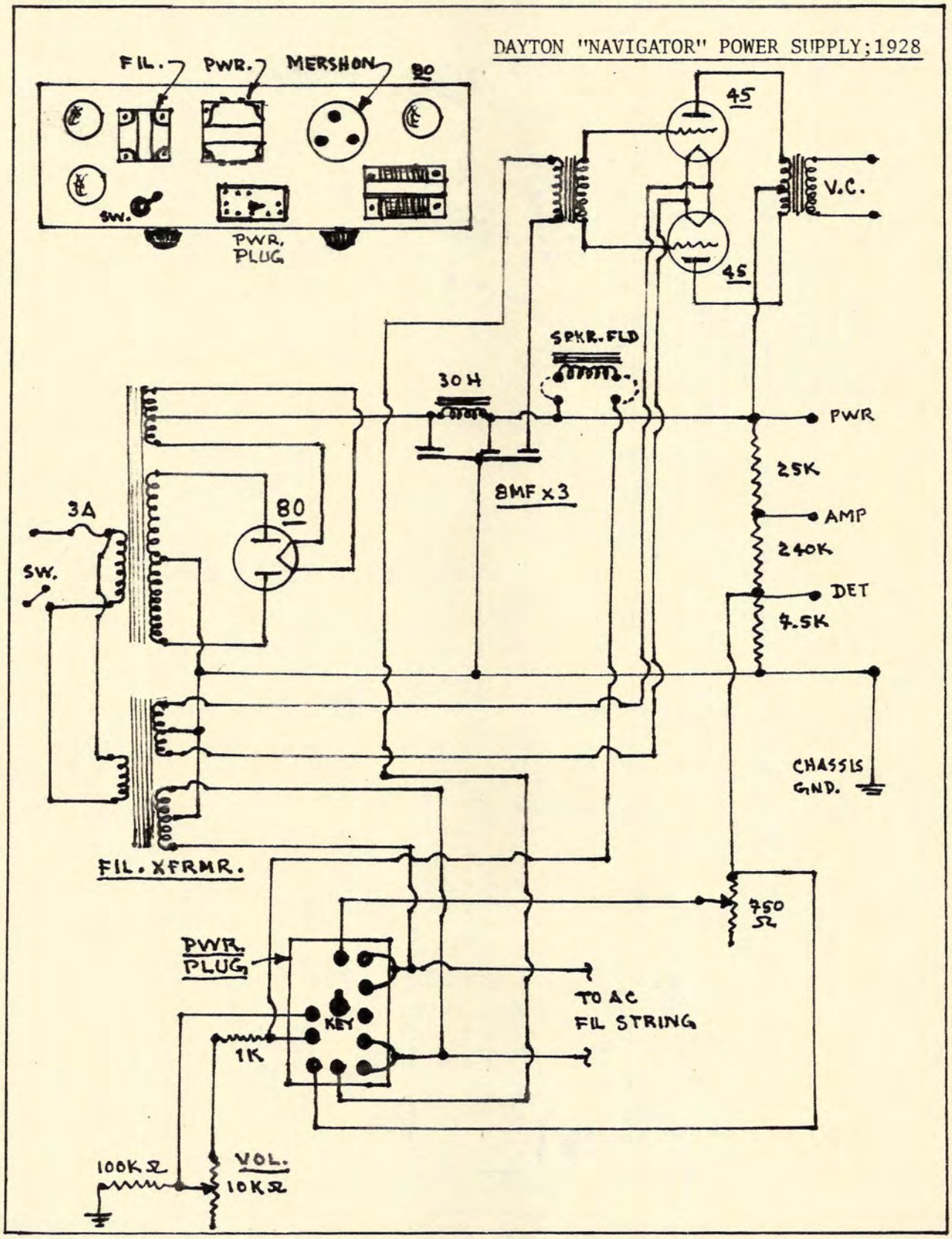
(HI-MU TUBES RECOMMENDED.)

DAVEN R-C AMPLIFIER CLARIFICATION, 1926

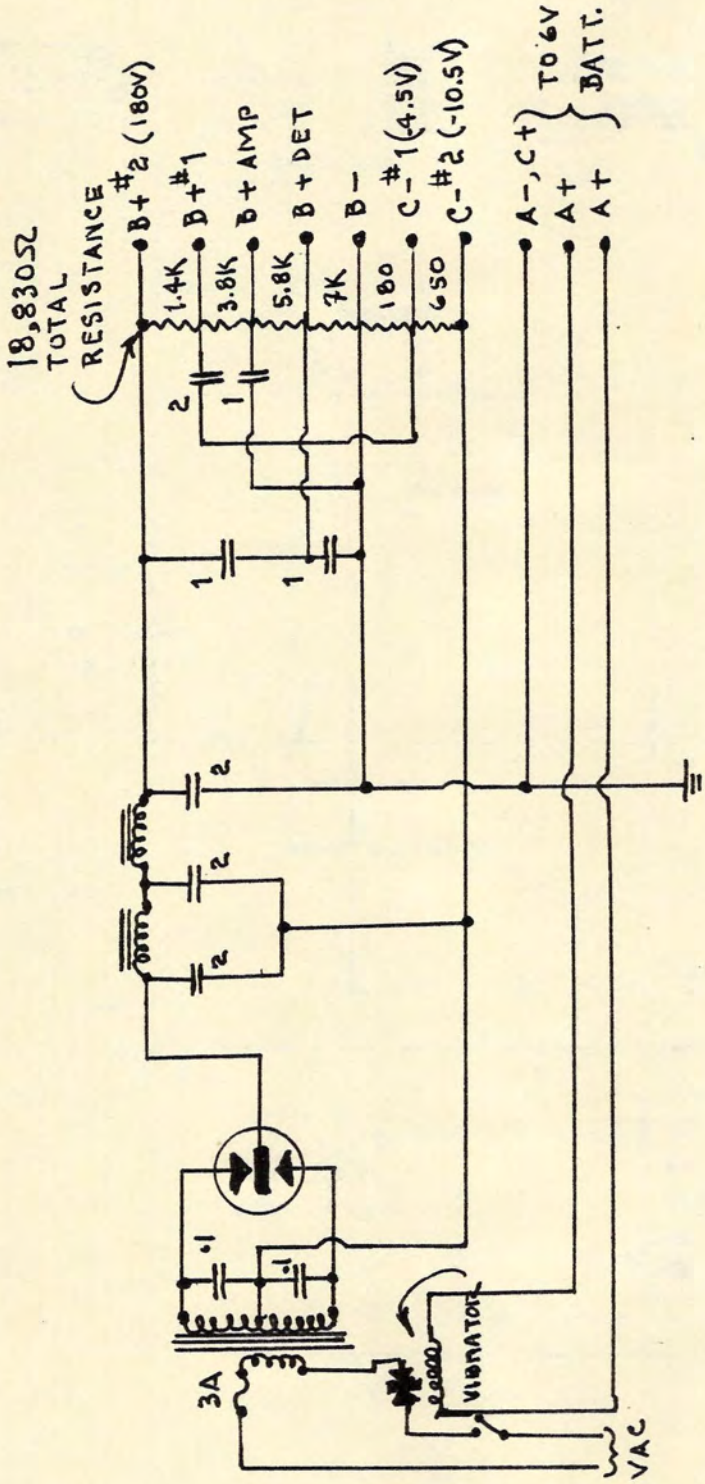




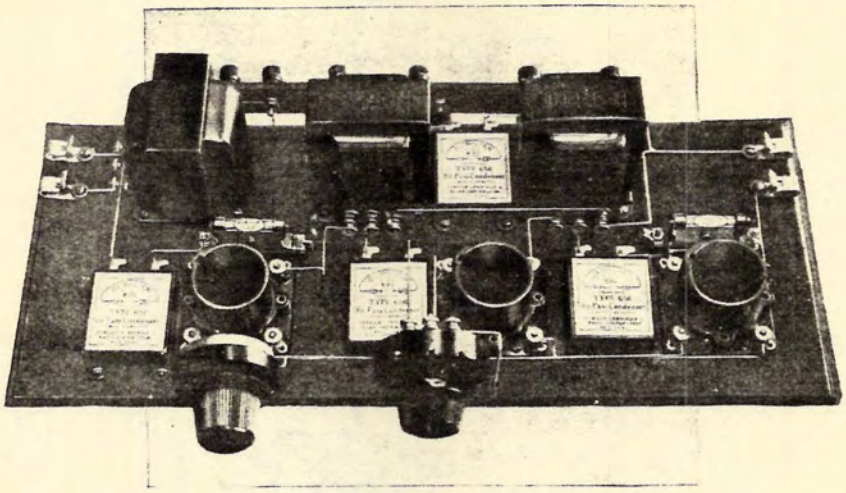
DAYTON "NAVIGATOR" POWER SUPPLY;1928

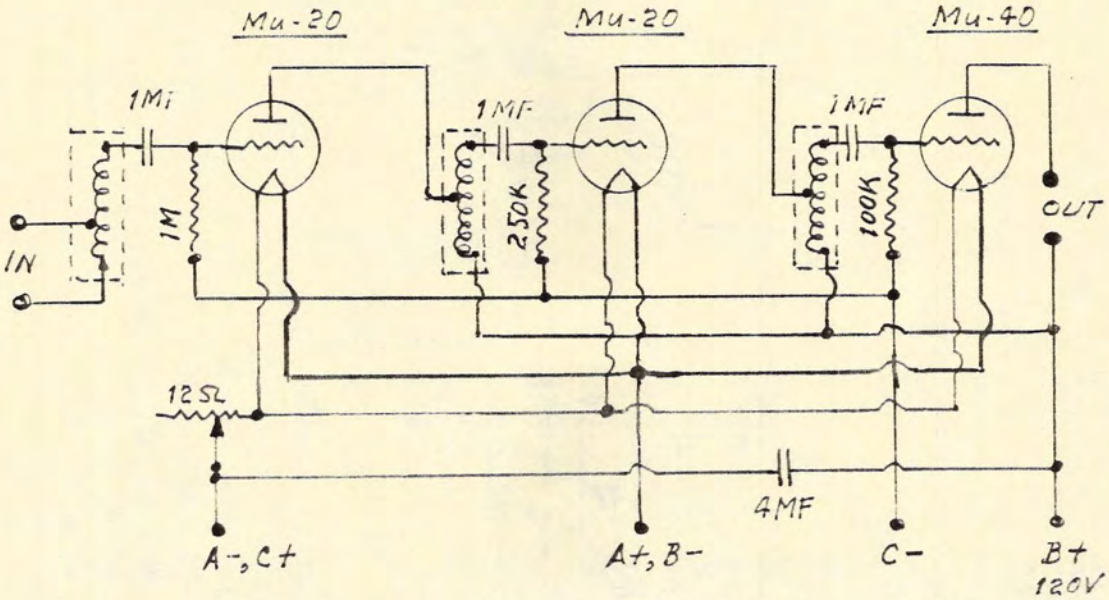


DAY-FAN MODEL 5050-7 ELIMINATOR,1927

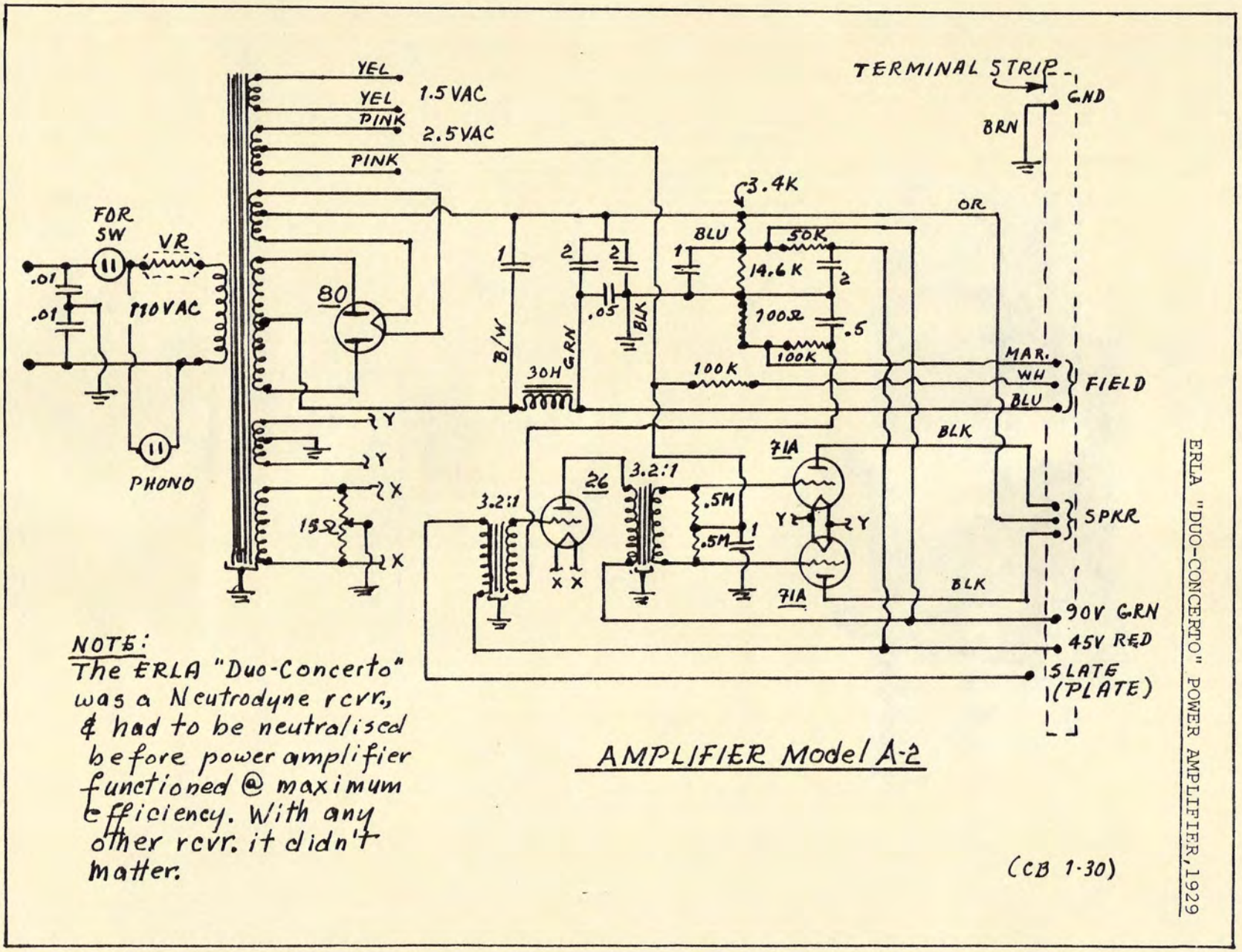


DUBILIER AF AMPLIFIER, 1926





(3) Coupling Impedances - called "Autoformers".



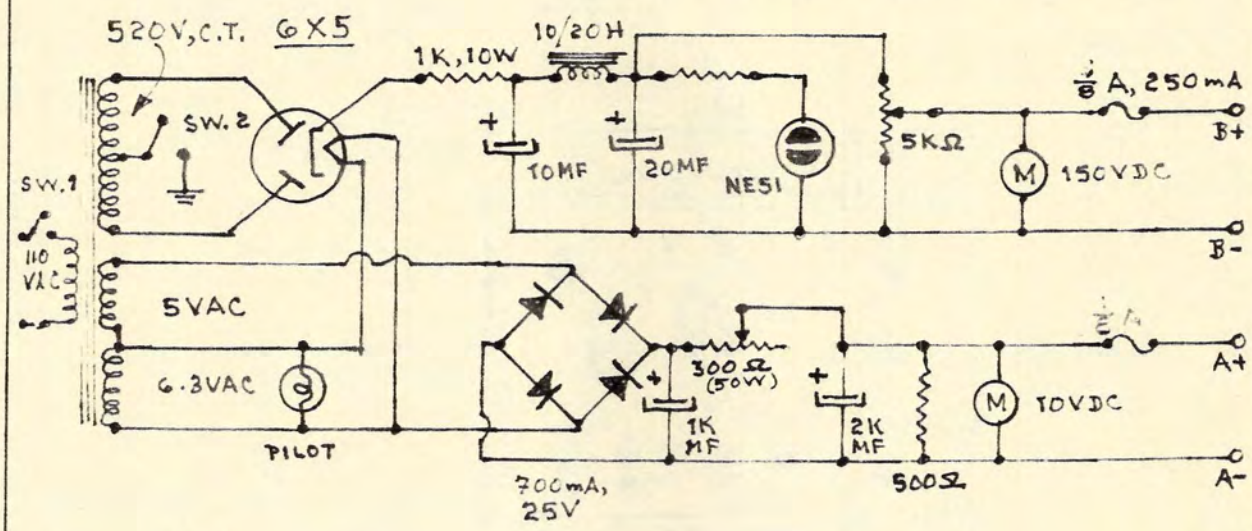
NOTE:
The ERLA "Duo-Concerto" was a Neutrodyne rcvr., & had to be neutralised before power amplifier functioned @ maximum efficiency. With any other rcvr. it didn't matter.

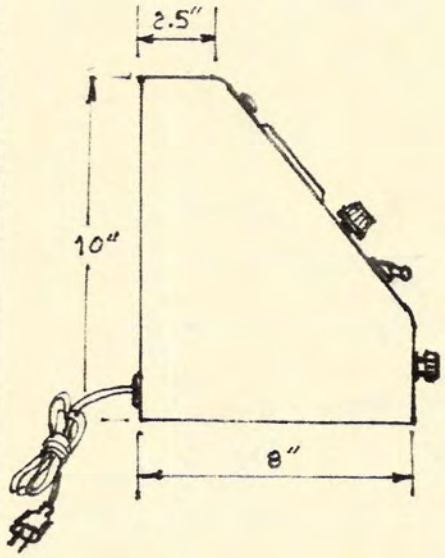
AMPLIFIER Model A-2

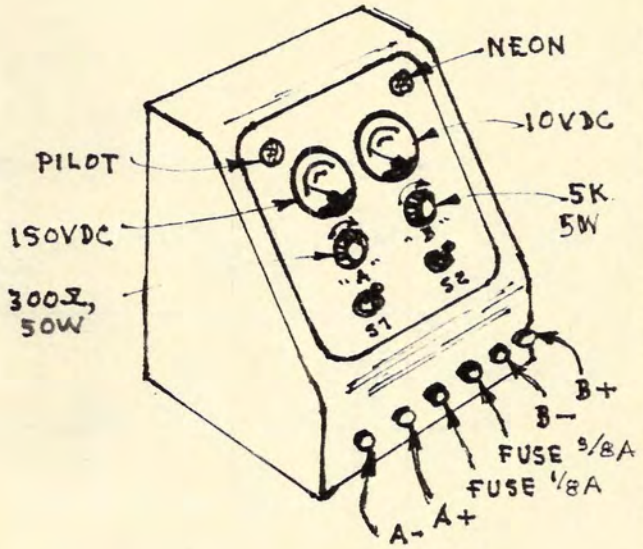
(CB 1-30)

ERLA "DUO-CONCERTO" POWER AMPLIFIER, 1929

EMANON A-B POWER SUPPLY, 1935







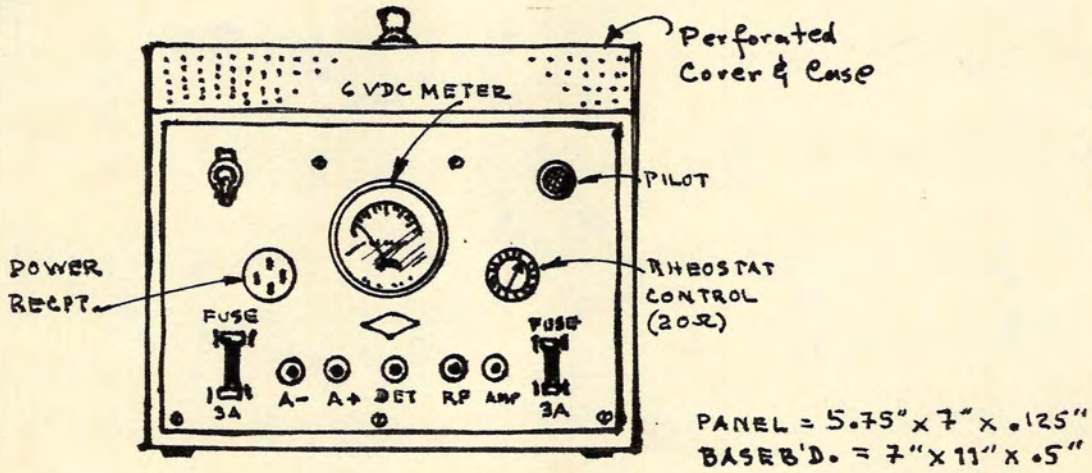
NOTES: 1. Connect load BEFORE turning unit on.

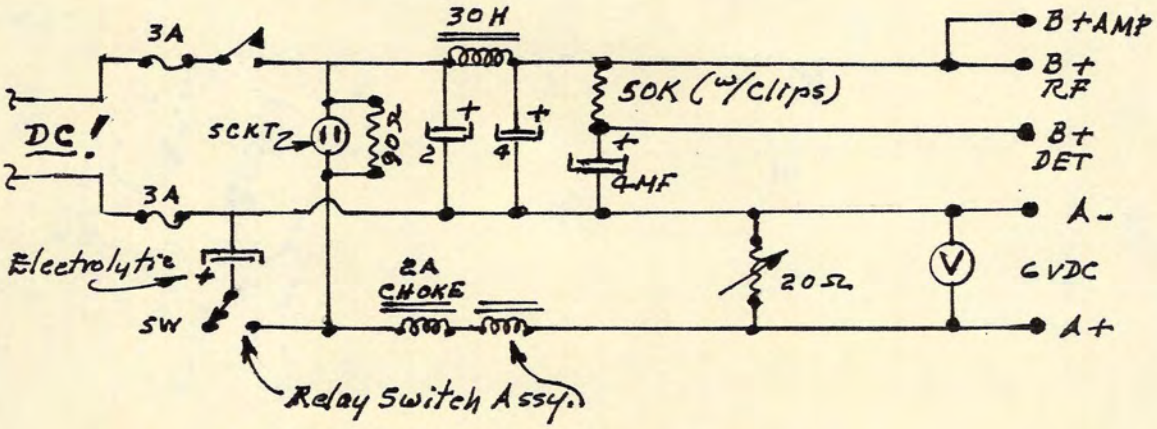
2. Set both Voltage Controls fully CCW.

3. Turn on SW. 2; Neon should illuminate.

4. Rotate 5K control slowly; Meter should show 150V.

EMANON A & B ELIMINATOR, 1928





NOTES

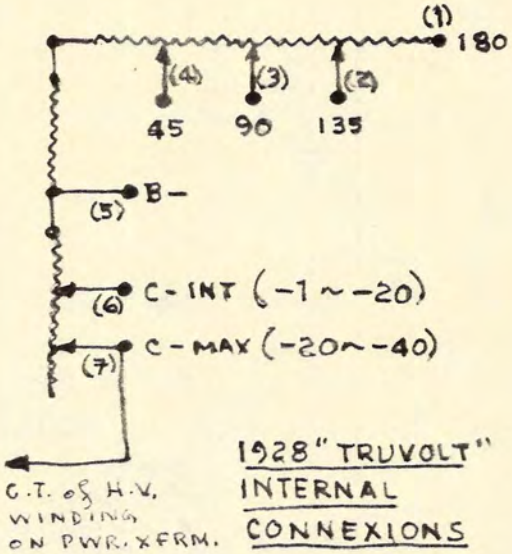
1. "SCKT." incorporatd a 90-ohm heavy-duty resistor.

2. Would operate sets with 5 to 10 tubes; PL voltage = 105V. DET tap voltage = 45V.

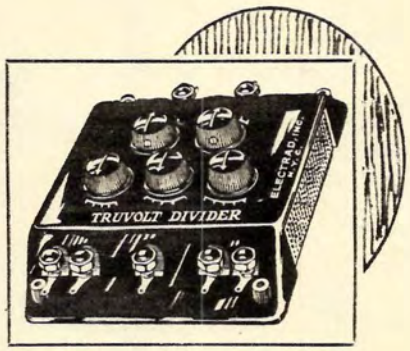
3. Originally kitted by Guaranty Radio for $22.50.

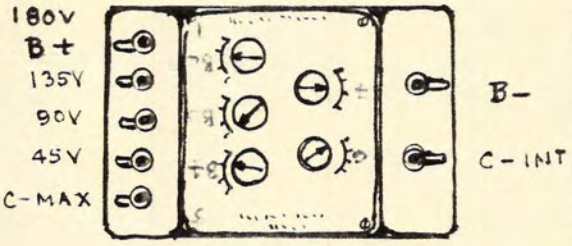
(RW-6-30-28)

ELECTRAD "TRUVOLT" DIVIDER NOTES; 1927
(U.S.Patent #1,676,869) ($12.50)

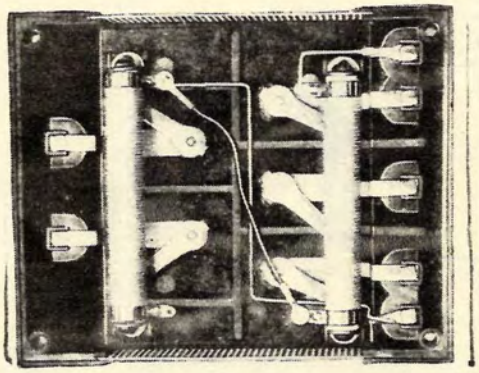


1928 "TRUVOLT" INTERNAL CONNEXIONS

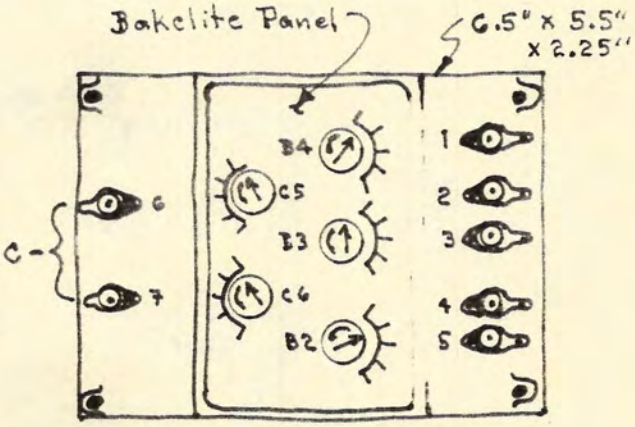




(1928)

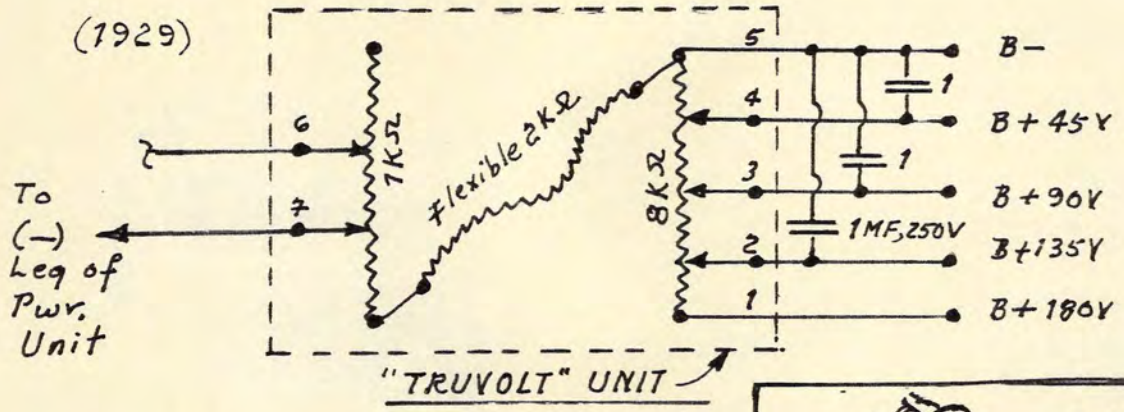


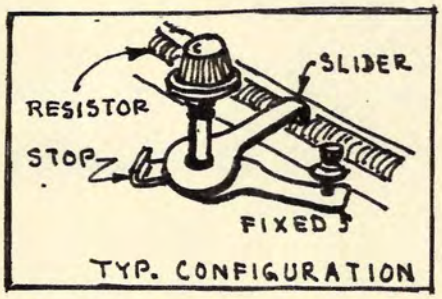
BOTTOM VIEW



PLAN VIEW

ELECTRAD "TRUVOLT DIVIDER NOTES: Sht. 2

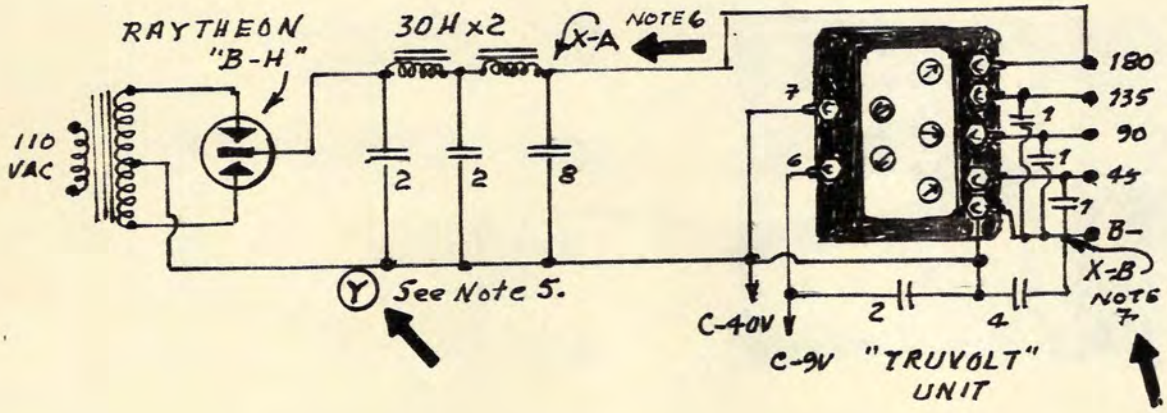


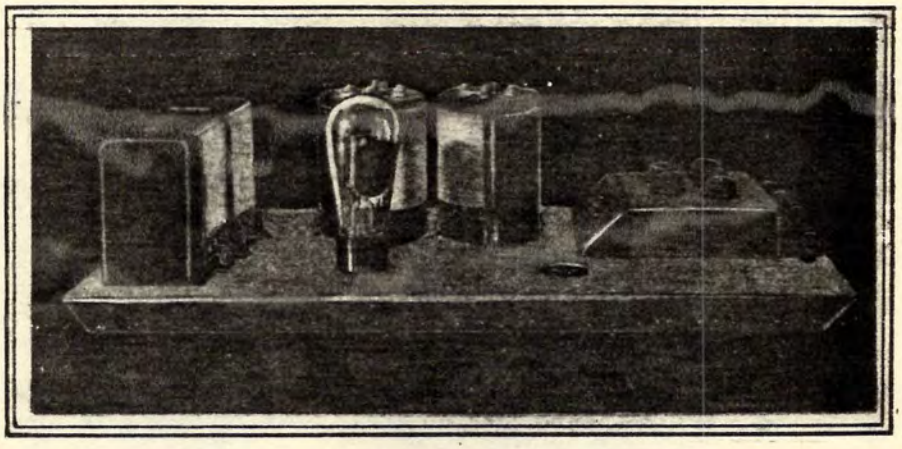


1. Will hande 6-tube TRF as follows:

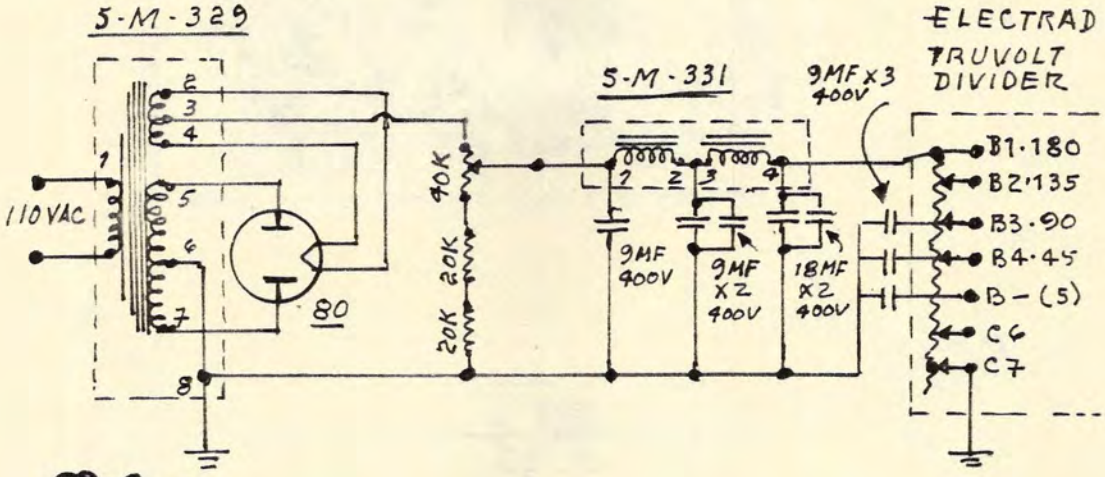
   (1) 01A @ 45V (1) 12A @ 135V
   (3) 01A @ 90V (1) 71A @ 180V

2. All by-pass condensers are external to unit,
3. Free terminals of 8K and 1K resistors are connected to binding posts, connecting to filter circuit of the power supply.
4. Binding Posts = #1 - 180V; #2 - 110/160V; #3 - 65/110V; #4 - 20/55V; #5 - 45V; #6 - 1/-20V; #7 - -20/-40V.
5. When #6 and #7 posts are used, #5 is GND; otherwise, at "Y"!
6. MA meter in series @ "X-A" will read C- and +45V.
7. MA meter in series @ "X-B" will read ALL circuits.
8. Meter = 0-1 mA.
9. #6 and #7 are used to control grid-bias voltage.
10. If power output exceeds 180V, insert rheostat.





AN ELECTRAD B-SUPPLY



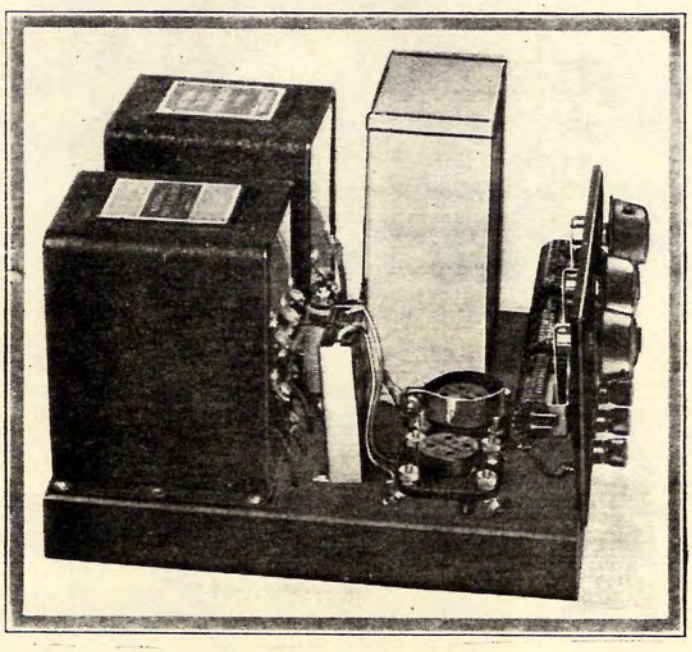
Original circuit called for (2) MERSHON electrolytics - Q-9 & Q-2-9-2-18. Modern electrolytics may be used with the values shown. A very neat and efficient supply.

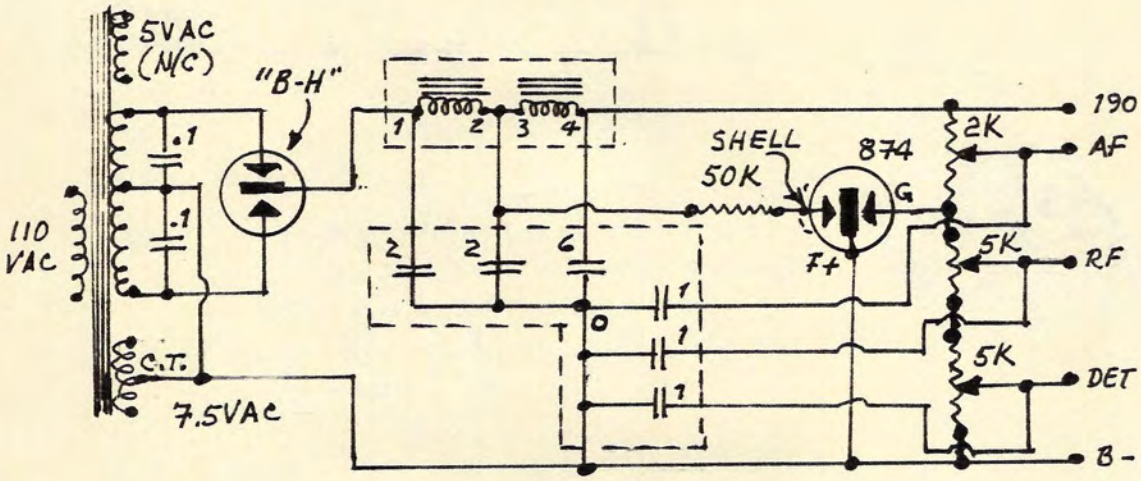
NOTES:

1. Base = 10"x20"x 3/4"; aluminum (may be wood).
2. Nos. power xfrmr. & chokes = nos. on S-M units.
3. The two 18mfd condensers can be one 36 mfd.
4. A- from set connected to B-.
5. If a dynamic spkr. is employed, connect Field Coil in series w/ #4 post of the chokes & the B1 (180V) post of the Truvolt Divider.

TRUVOLT "B" SUPPLY UNIT: 1928

(sht. 1)



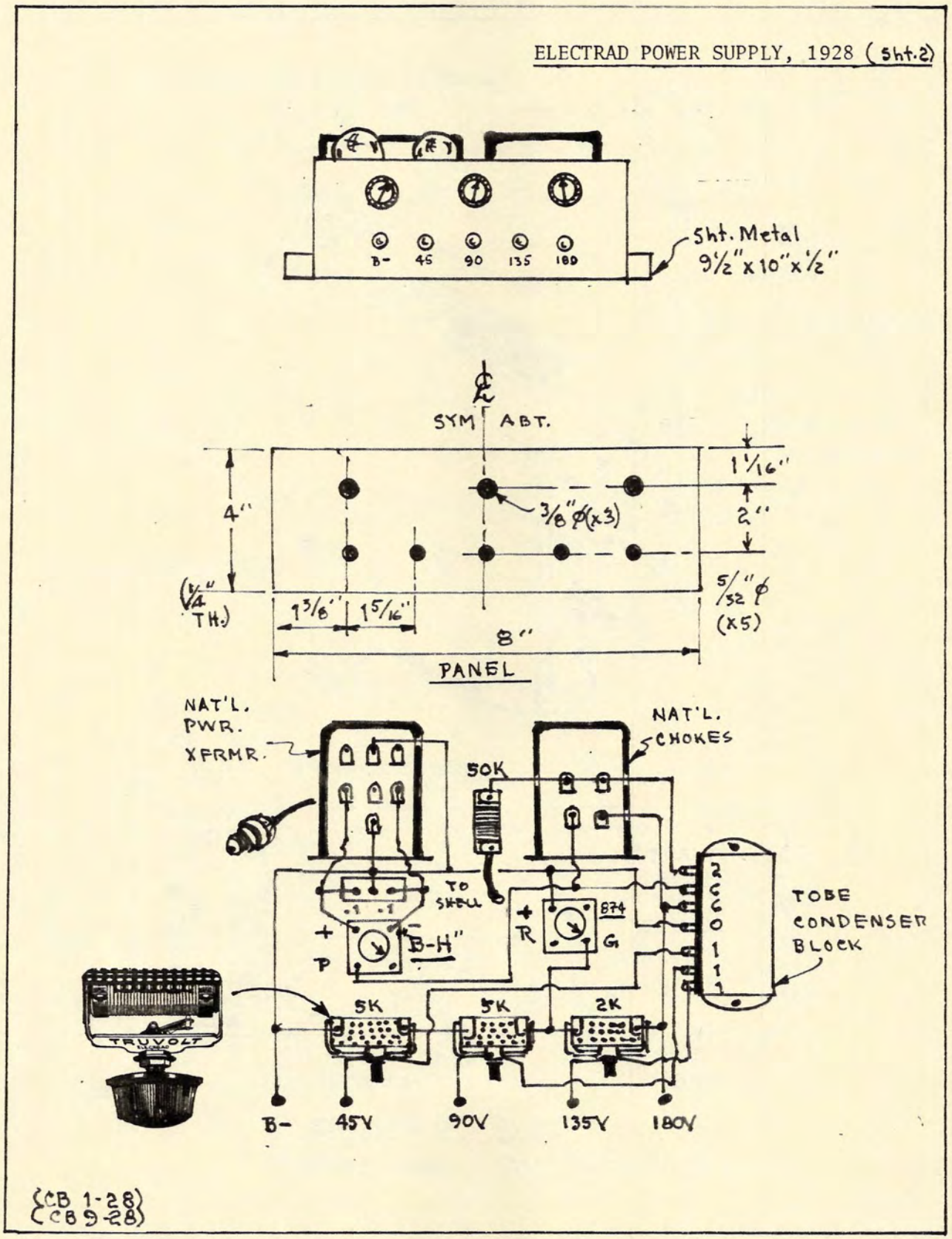


NAT'L. R PWR. XFRMR.
NAT'L. R FILTER CHOKE.
TOBE R COND. BLOCK.
TOBE BUFFER COND.

ELECTRAD TRUVOLT TUBULAR
POTS.- (1) T-20, 2K
(2) T-50, 5K
RAYTHEON "B-H" & 874.

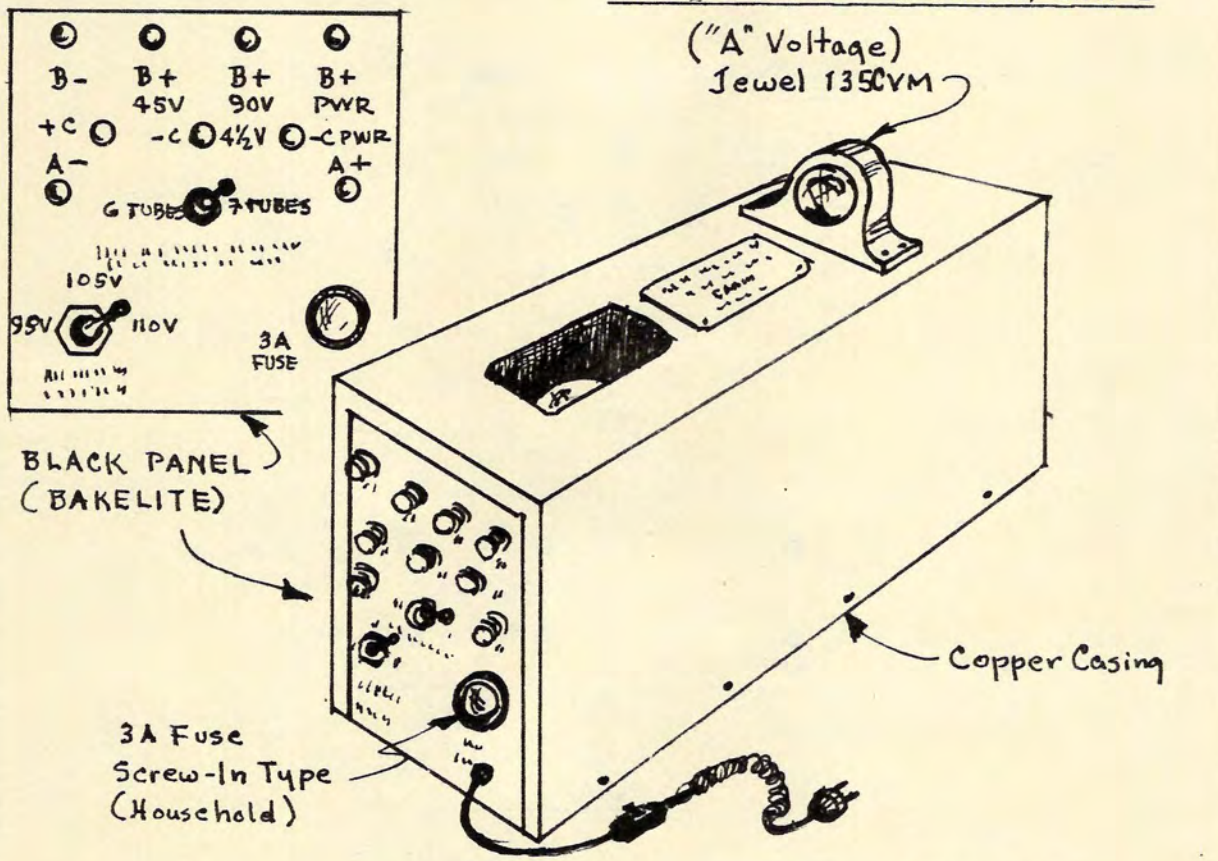
(CB 1-28)

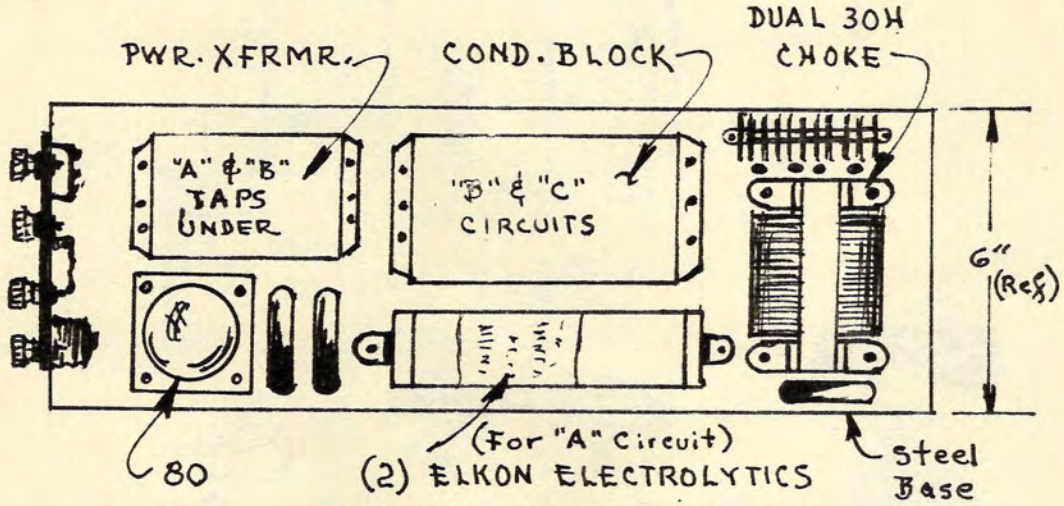
ELECTRAD POWER SUPPLY, 1928 (Sht.2)



(CB 1-28)
(CB 9-28)

FADA Q-66 A-B-C ELIMINATOR, Sht. 1

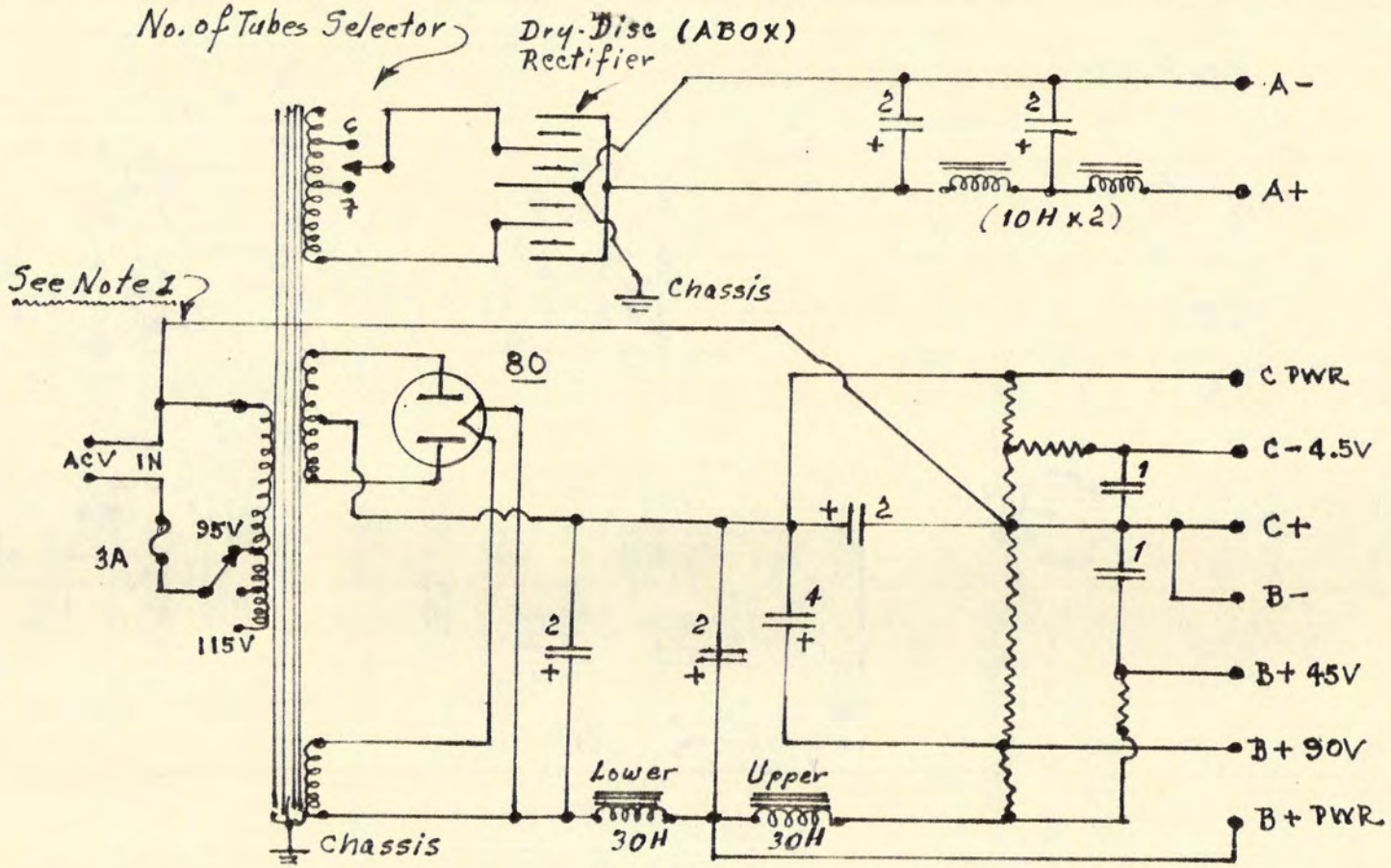




COVER REMOVED

6" x 7¾" x 17½" O/A. Weight = 27#.

(ORSM - 154)



NOTES: 1. XFRMR. CASING GROUNDED.
2. ALL CAPACITORS IN A SINGLE BLOCK; SEE SHT. 1.
3. DUAL CHOKES IN TANDEM; SEE SHT. 1.

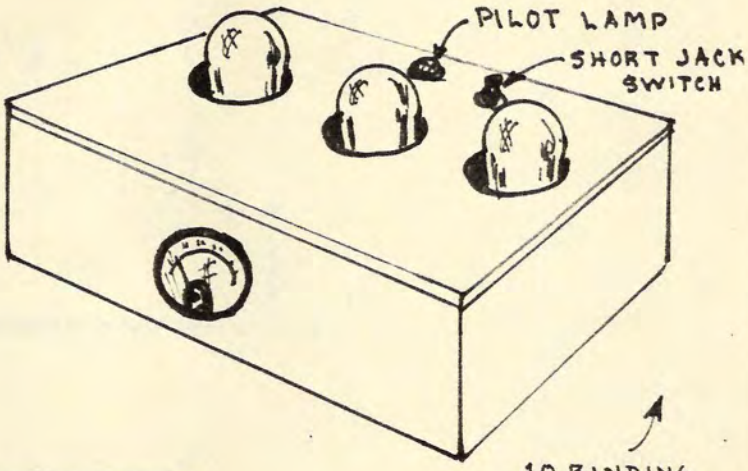
(ORSM-154)

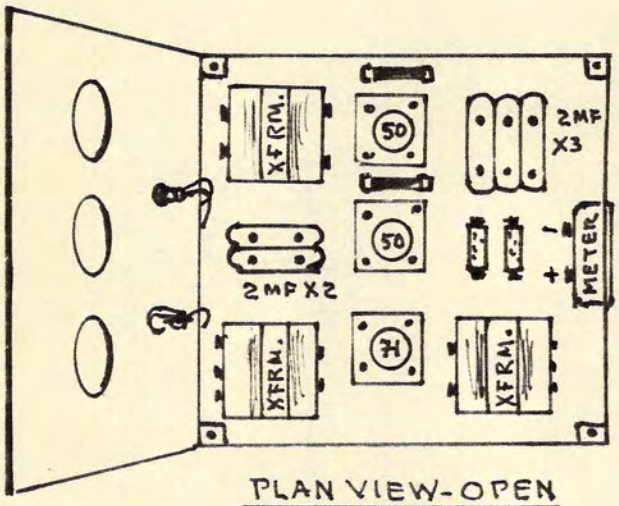
FADA Q-66 A-B-C Eliminator, '28; Sht. 2

FERRANTI P-P STRAIGHT-LINE AMPLIFIER

Grid bias of Power Tubes must be adjusted to 110 mA when using 50 tubes

BAKELITE PANELS REQ.:
10½"x12"x⅛"~ TOP
10½"x12"x 3/16"~ BASE
(2) 11¾"x4"x ⅛"~ FRONTS
(2) 10"x4"x ⅛ - ENDS
(For PWR Supply, see page 63.)

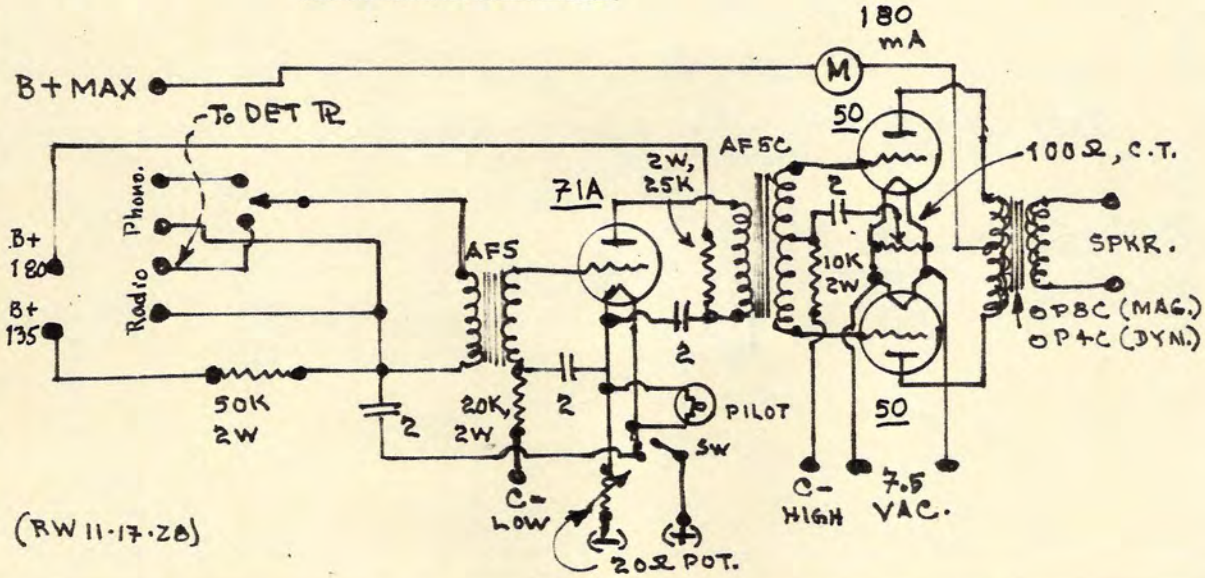


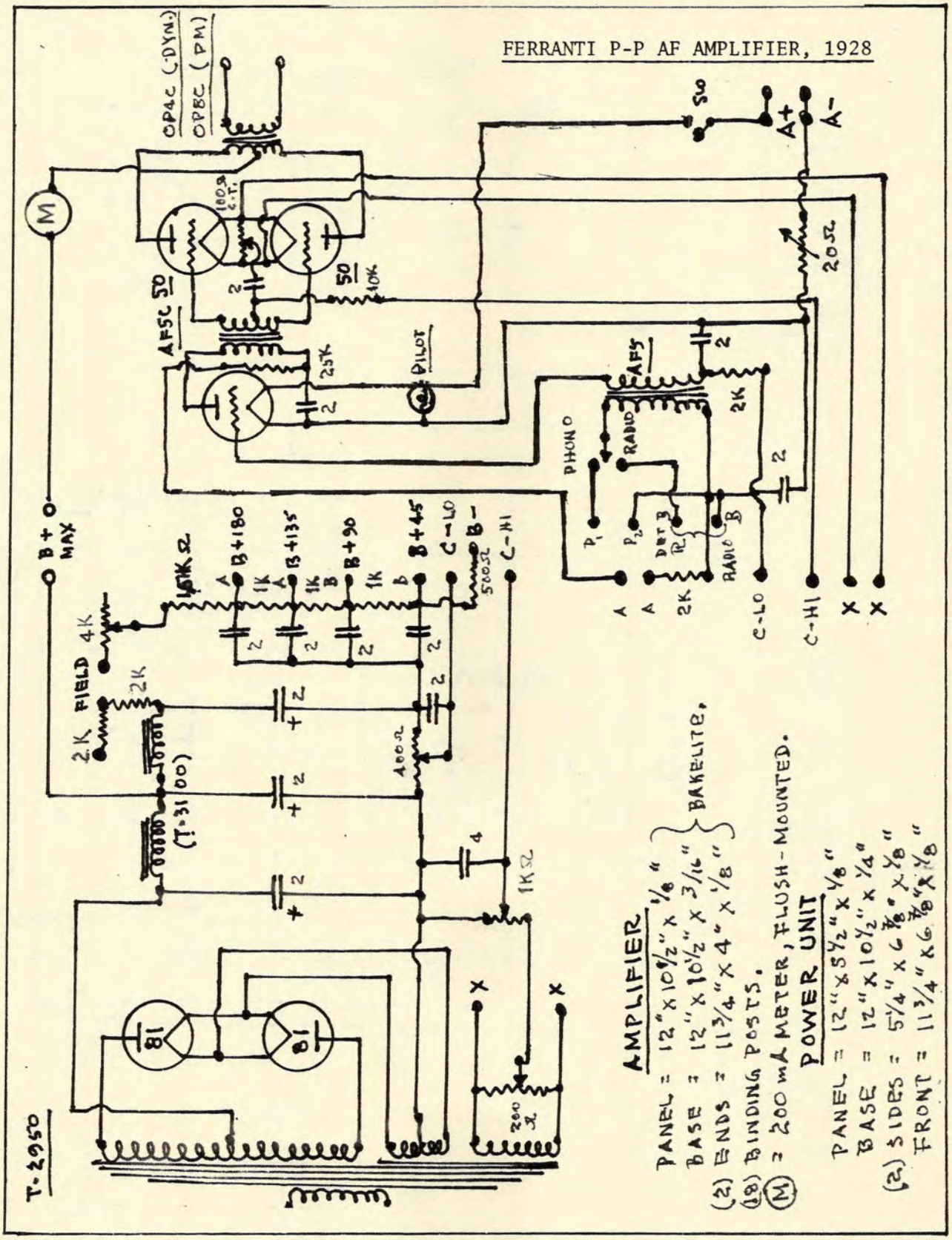


PLAN VIEW-OPEN

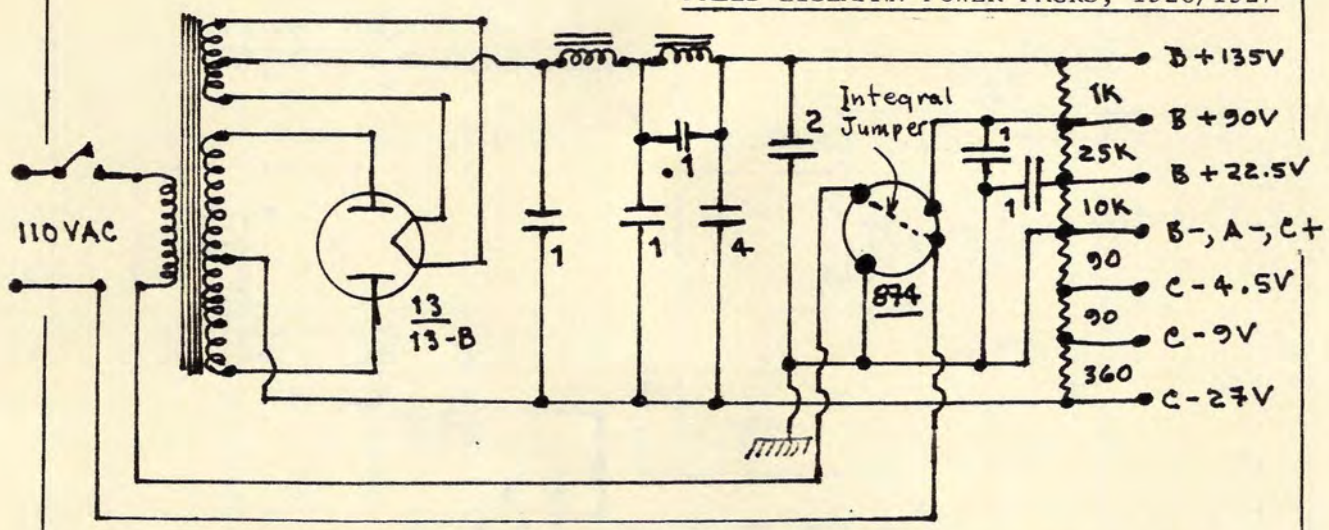
NOTES:

1. B- connected to A- or A+, as in set's RF circuit.
2. Seperate FIL xfrmrs. required for the 71A & 50s.
3. FERRANTI xfrmrs. were AF5, AFSC, OP8C/OP4C, as shown.




FERRANTI P-P AF AMPLIFIER, 1928
OP4C (DYN.)
OP8C (PM)
AFSC
PILOT
AF5
PHONO
RADIO
DET B
B+ O MAX
FIELD
(T-3100)
B+180
B+135
B+90
B+45
C-LO
B-
C-HI
A+
A-
SW
T-2950
AMPLIFIER
PANEL = 12" x 10½" x 1/8"
BASE = 12" x 10½" x 3/16"
(2) ENDS = 11¾" x 4" x 1/8"
BAKELITE.
(18) BINDING POSTS.
(M) = 200 mA METER, FLUSH-MOUNTED.
POWER UNIT
PANEL = 12" x 8½" x 1/8"
BASE = 12" x 10½" x 1/4"
(2) SIDES = 5¼" x 6 1/8" x 1/8"
FRONT = 11¾" x 6 1/8" x 1/8"

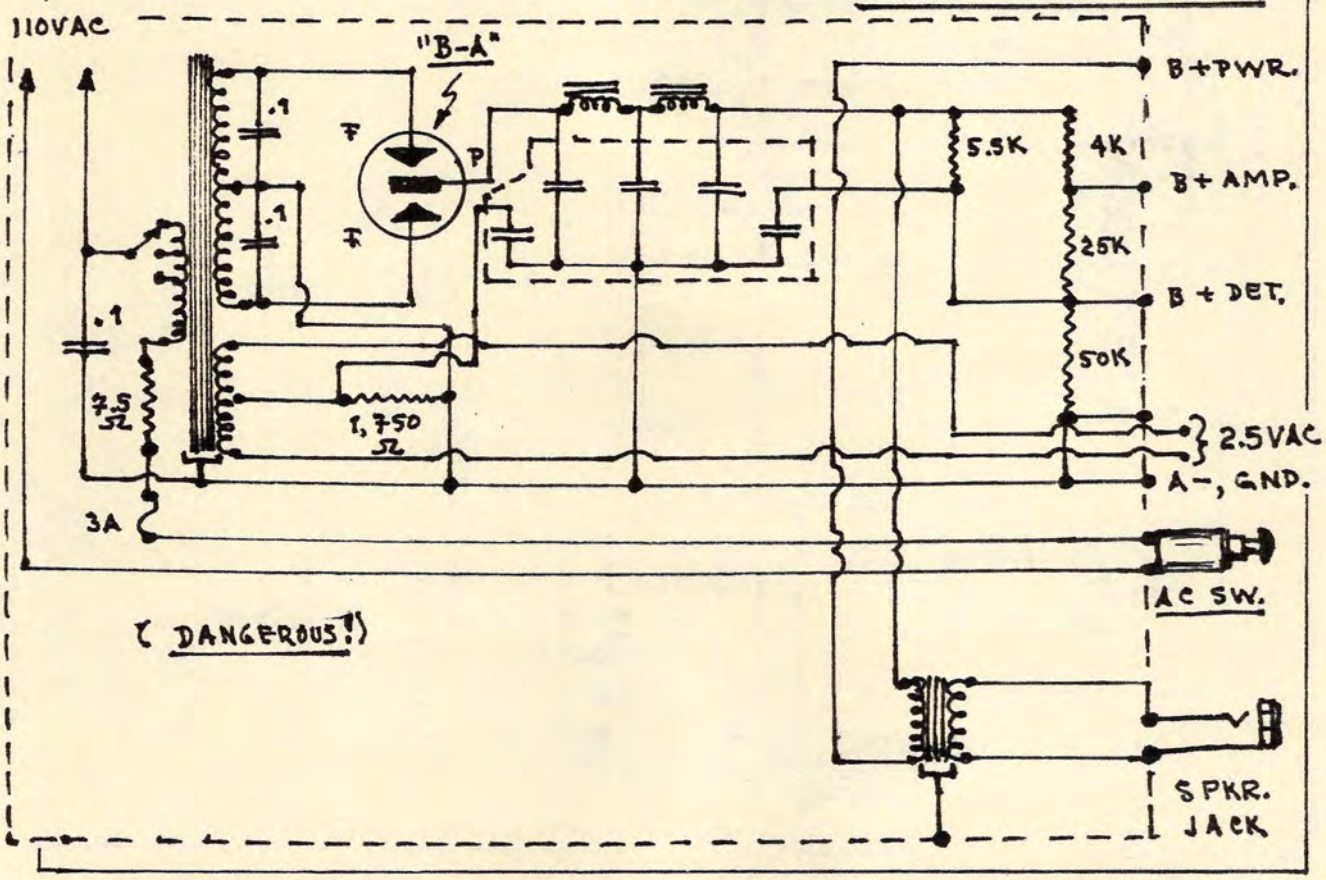
FREED-EISEMANN POWER PACKS; 1926/1927



Circuit is closed when 874 tube is inserted.

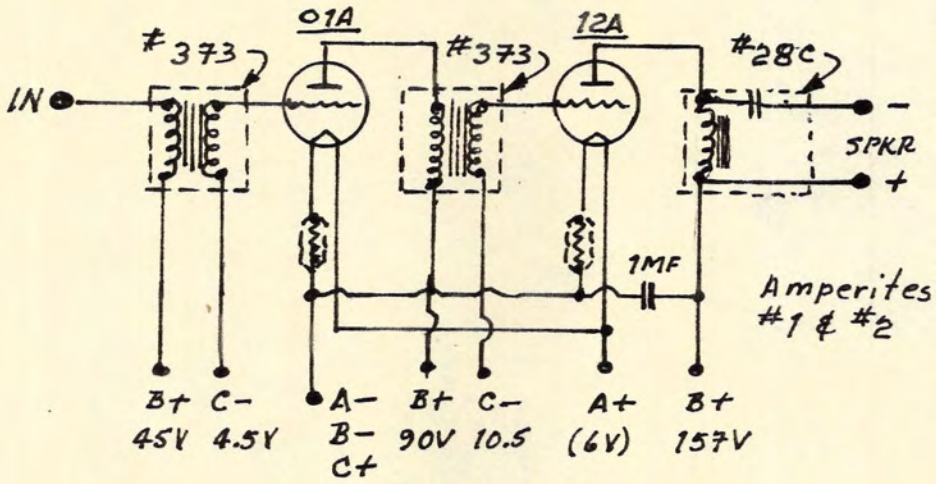
"B" & "C" ELIMINATOR

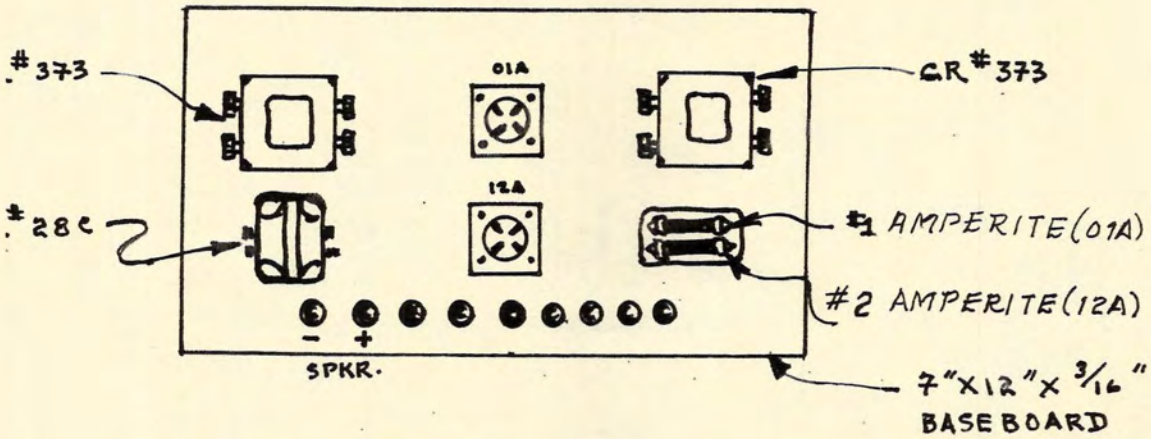
POWER PACK-NR-11



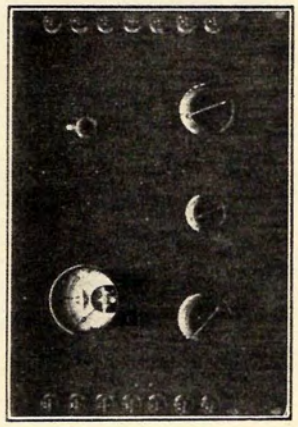
(DANGEROUS!)

GENERAL RADIO IMPEDANCE-COUPLED AF AMPLIFIER, 1927

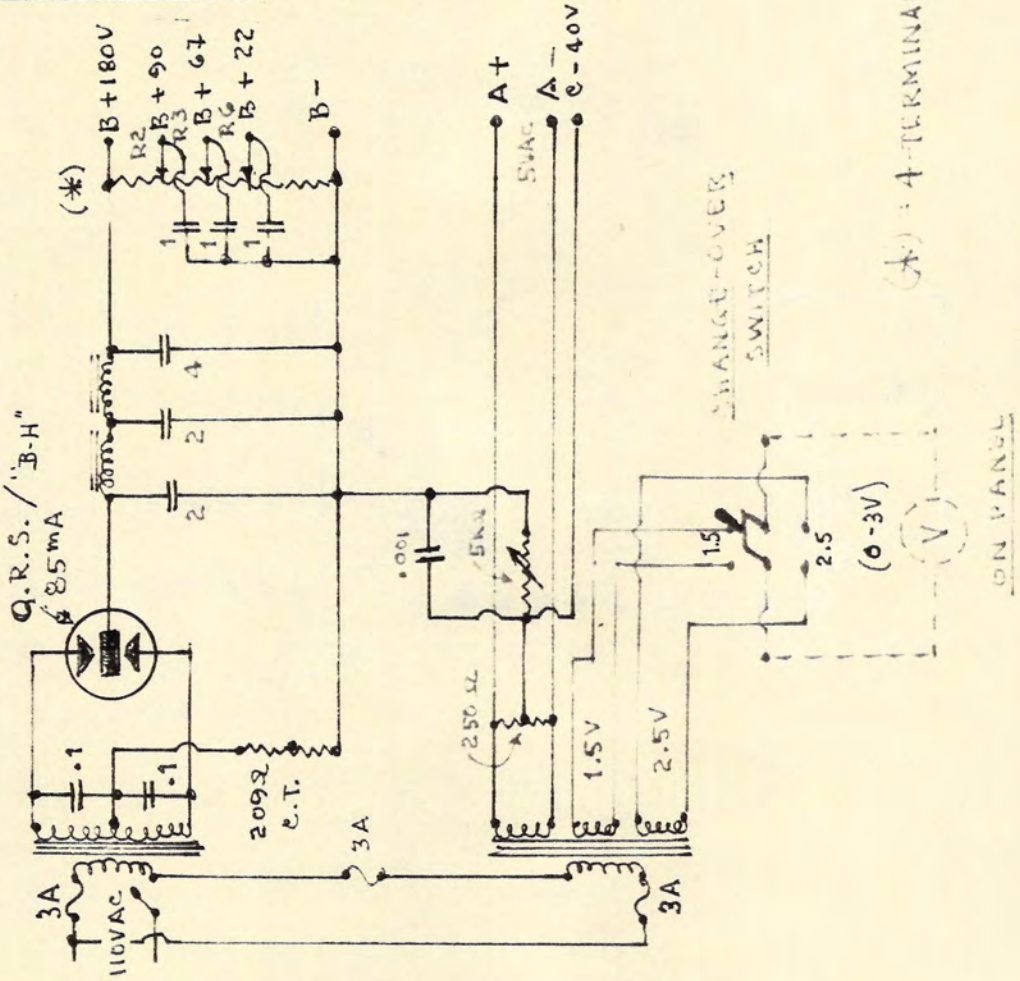


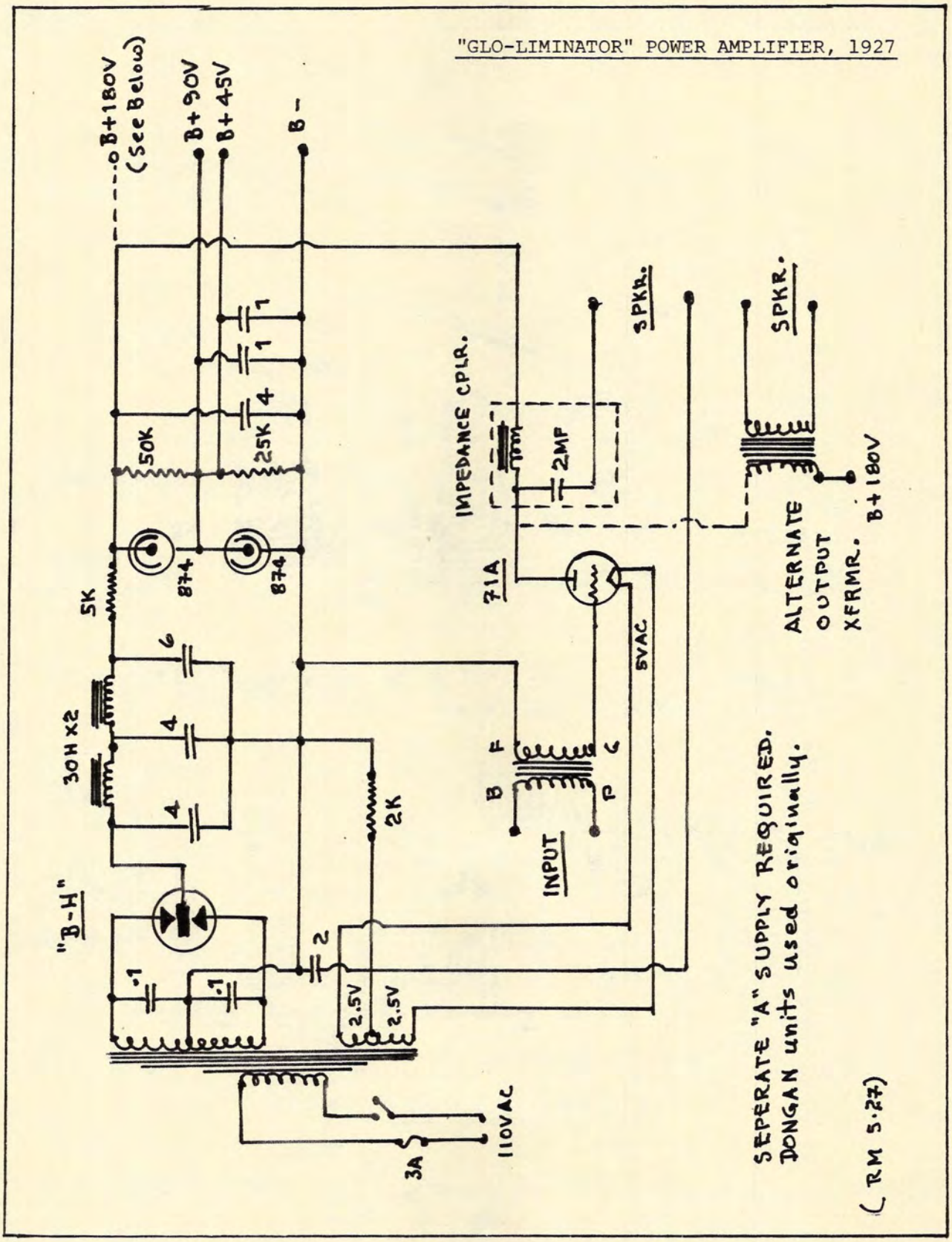


GOODWIN AC DRIVER CIRCUIT, 1927



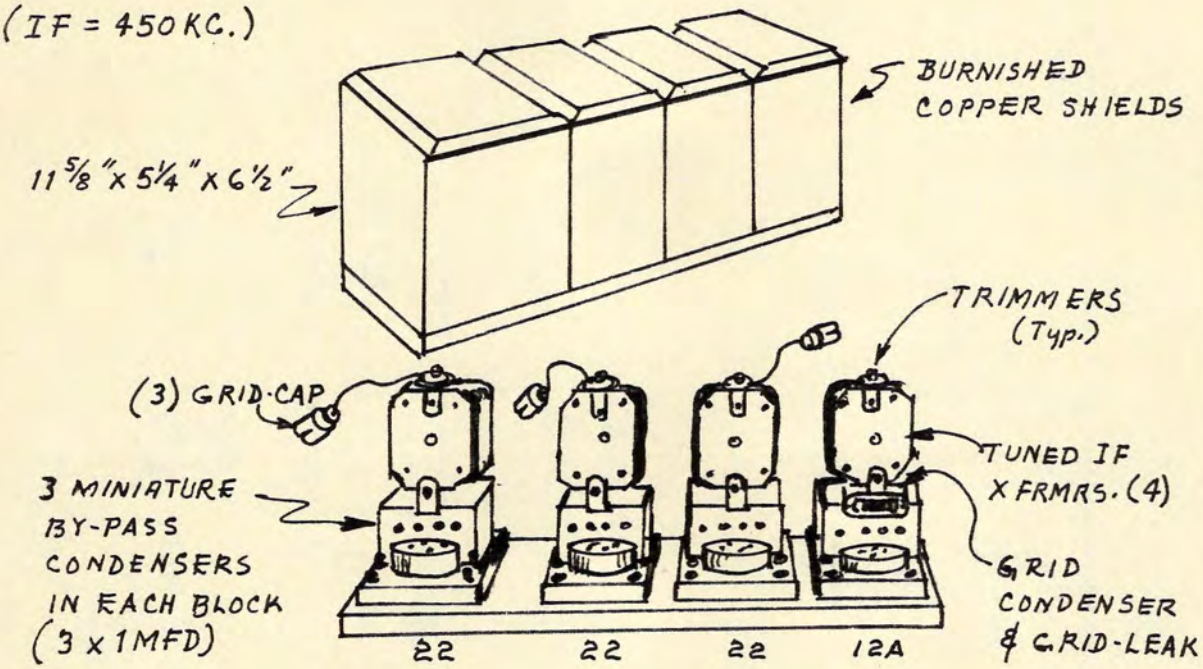
PANEL



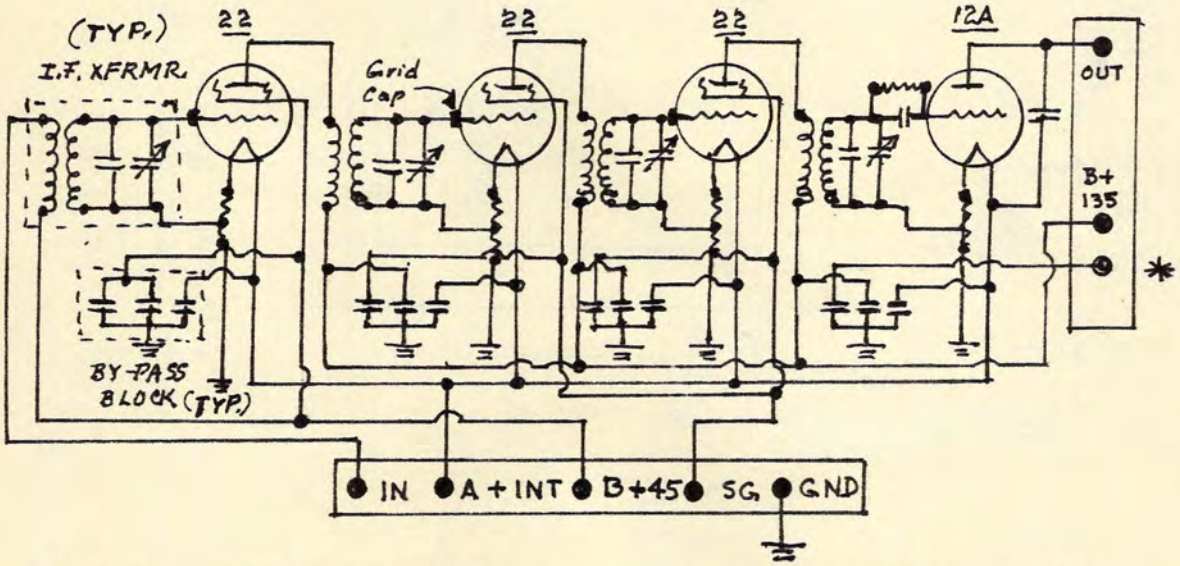

"GLO-LIMINATOR" POWER AMPLIFIER, 1927
B+180V (See Below)
B+90V
B+45V
B-
1
1
4
50K
25K
874
874
5K
6
4
4
30H x2
"B-H"
.1
.1
2
2K
2.5V
2.5V
110VAC
3A
IMPEDANCE CPLR.
2MF
71A
5VAC
B F
P G
INPUT
SPKR.
SPKR.
ALTERNATE OUTPUT XFRMR.
B+180V
SEPERATE "A" SUPPLY REQUIRED.
DONGAN units used originally.
(RM 5.27)

H-F-L I.F. AMPLIFIER, 1929

(IF = 450KC.)



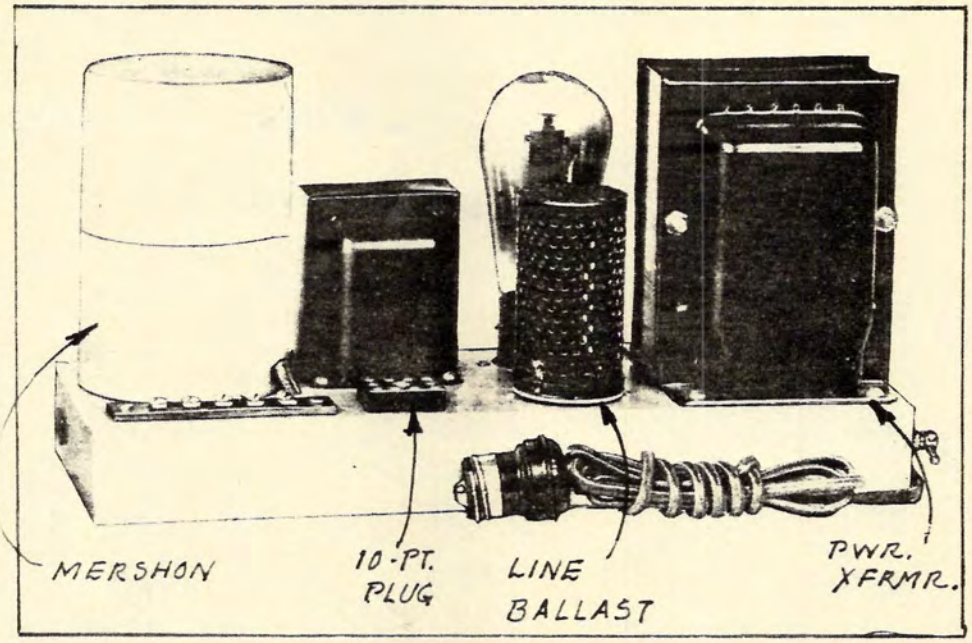
I.F. xformers. were duo-lateral PRI & SEC windings, #32 SSC, on a wooden bobbin, slotted form.

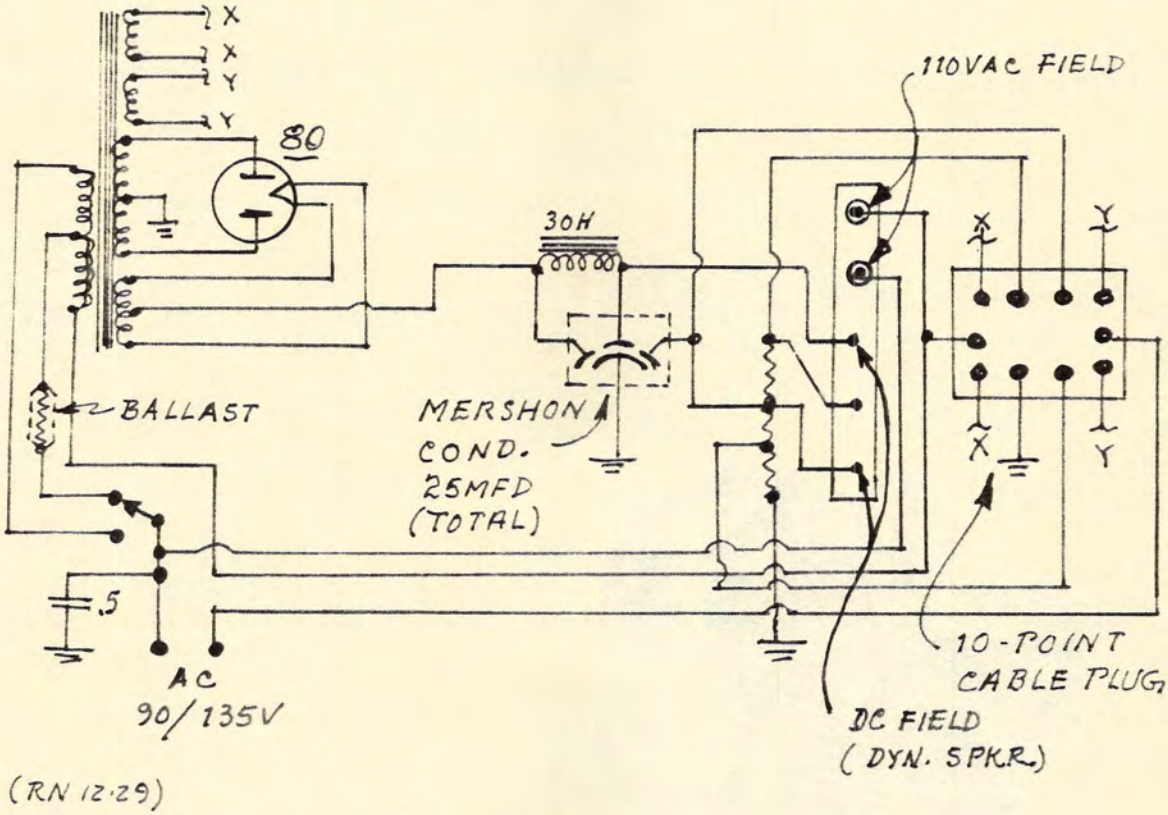


* = Unmarked post w/ by-pass may be used for whatever purpose the constructor wishes.

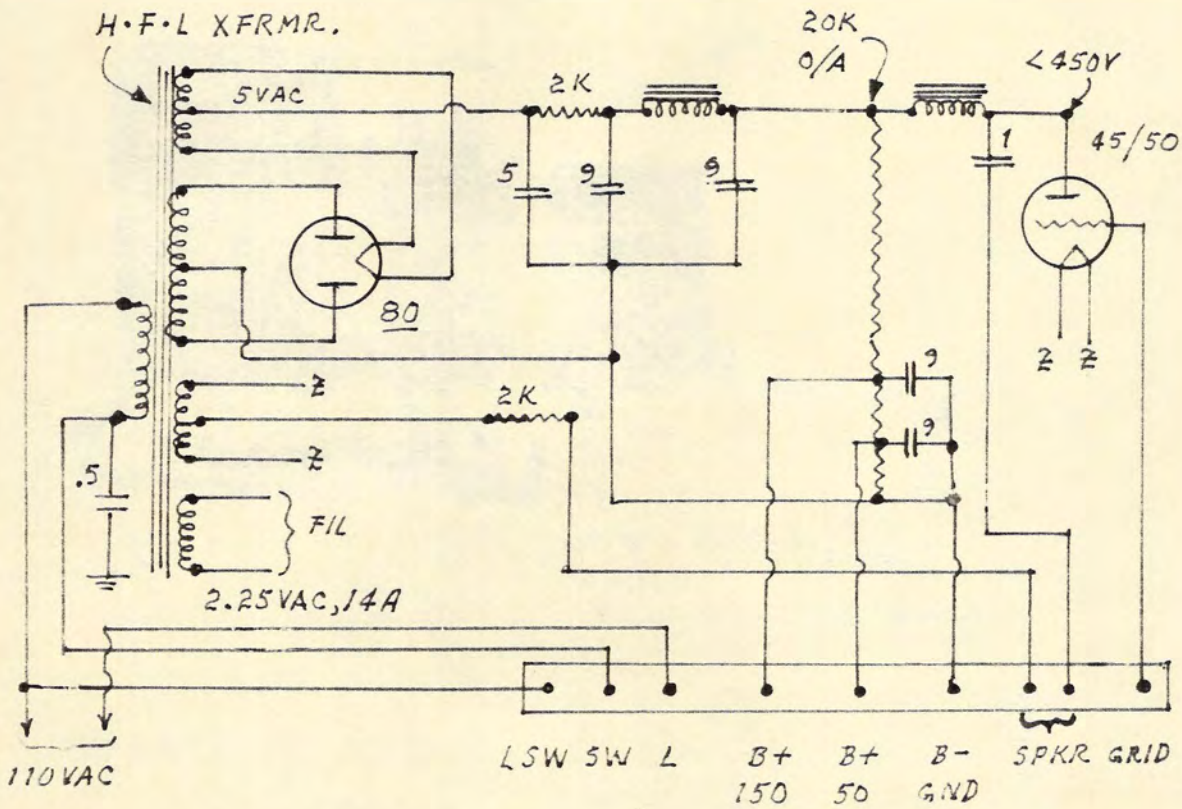
(RN 1-29)

H-F-L "MASTERTONE" POWER UNIT, 1929





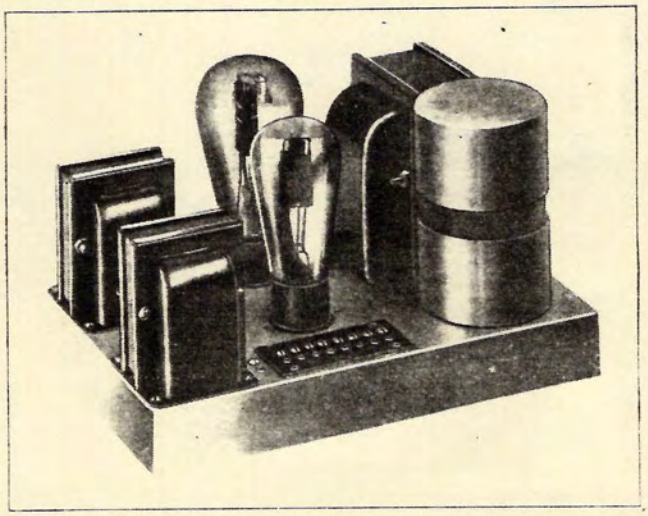
H.F.L. AC-9 POWER AMPLIFIER, 1929; $77



This was a resistance-capacity/inductance-capacity filter system.

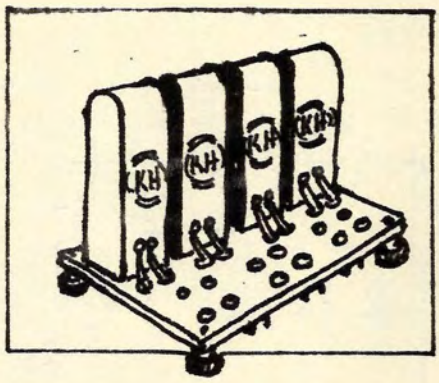
Outlet designations were H.F.L. designations to match designations on their "Special AC-9" receiver.

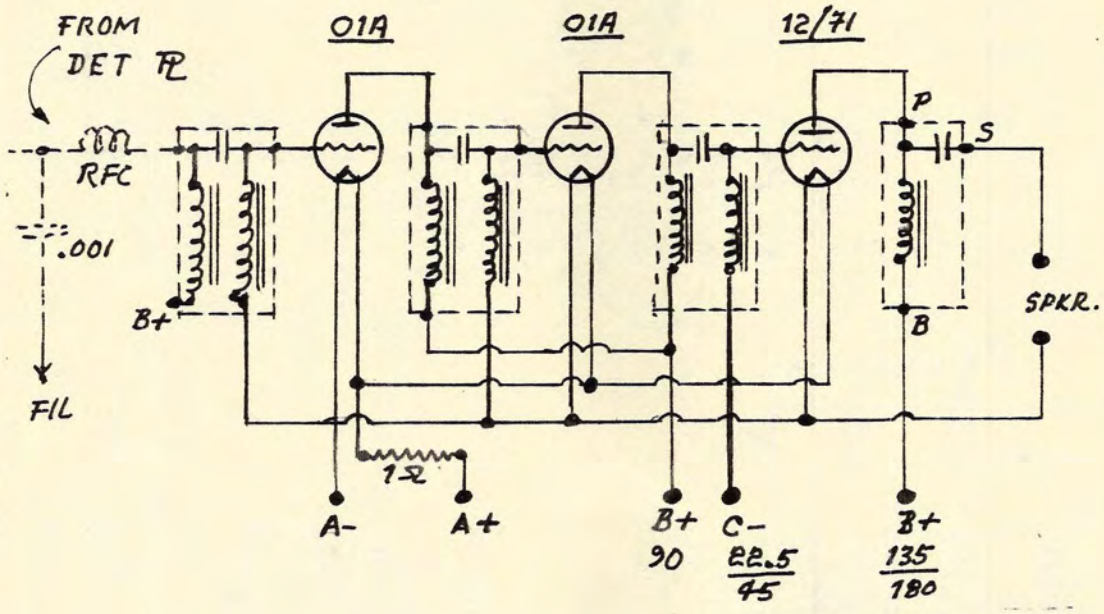
Power ON-OFF switch was on the receiver.



ORIGINAL CONFIGURATION

HARKNESS-HILER TUNED DOUBLE-IMPEDANCE
AF AMPLIFIER, 30 to 10,000 Cycles; '27

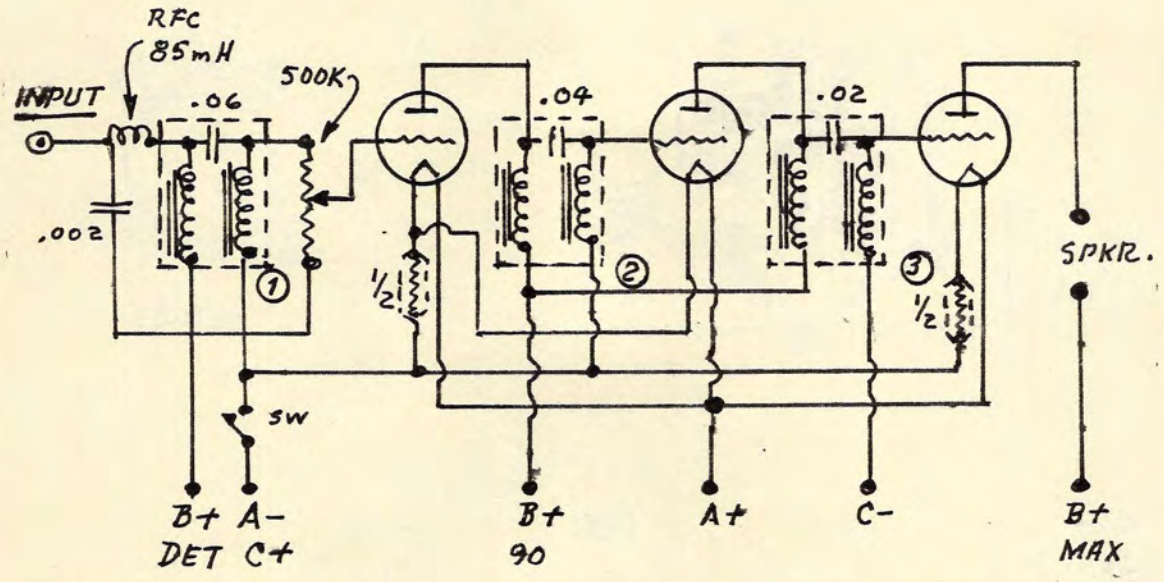




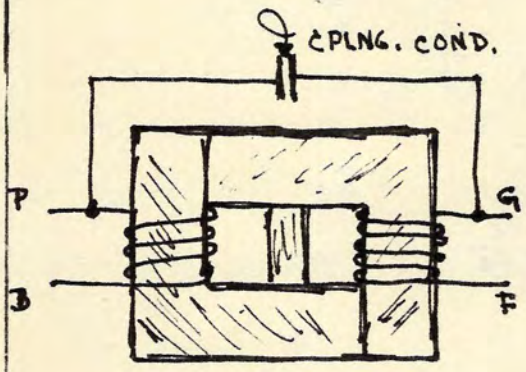
NOTES:

Kenneth Harkness was one of the first to adopt the E.E.Hiler patent for double-impedance AF amplification.
Seven battery posts were required; .001 cap. essential
Sub-Panel had four supports; was 6" x 9" x ¼".
One-Ohm resistor mounted under sub-panel.

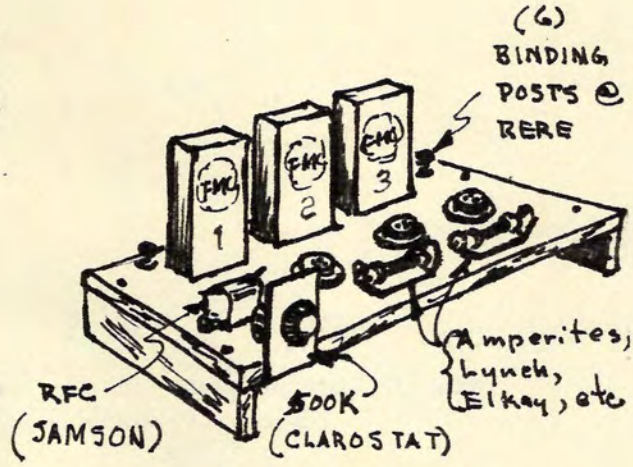
E.E.HILER TUNED-IMPEDANCE AF AMPLIFIER
(1927)



NOTES:
1. Frequency response curve can be altered by changing the values of the coupling-condensers - e.g., .03 MFD/.08 MFD.
2. (3) Double-Impedance units by HILER.
3. Baseboard = 6" x 15" x ½". Panel = 2" x 4" x ¼". (for pot)
4. End Supports = 1½" x 6" x ½" (2).

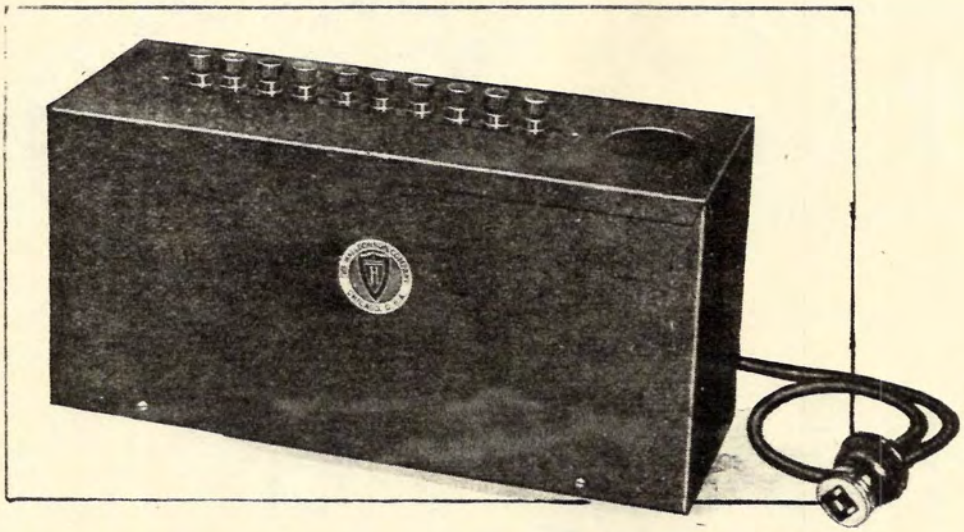


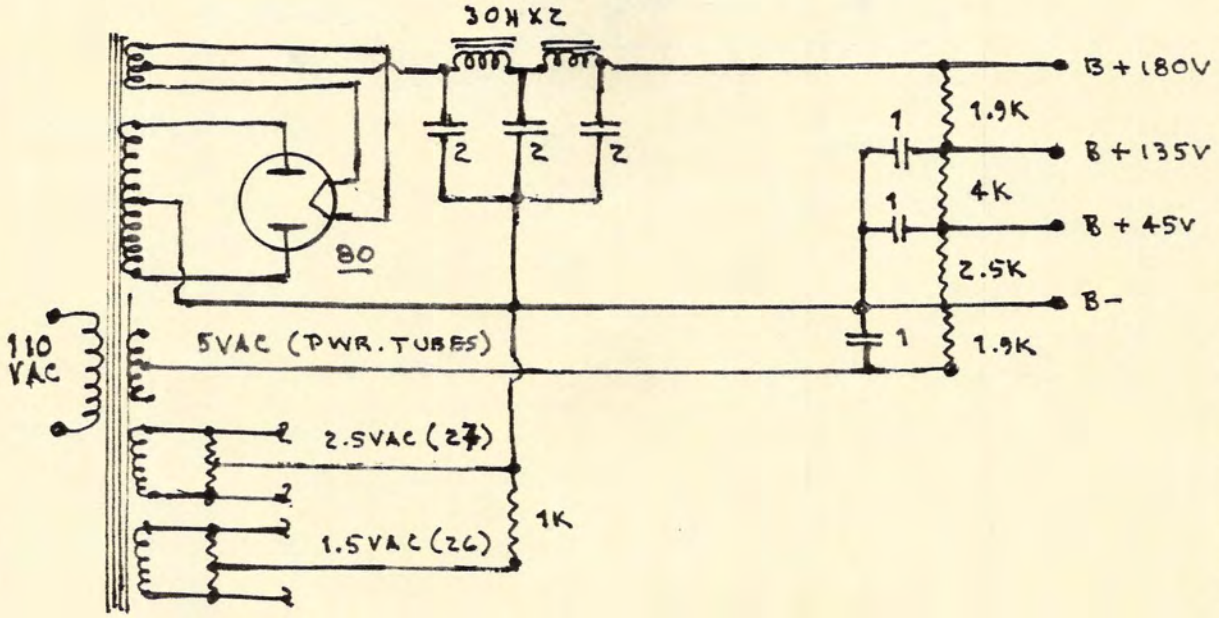
Each coil is wound on a seperate leg of the Figure-8 laminations.



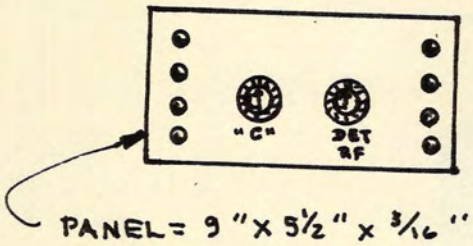
(3) FORD MICA CO. UNITS SHOWN

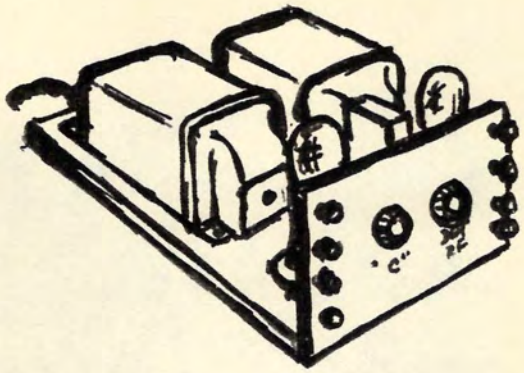
HALLDORSON AC-56 POWER SUPPLY, 1929

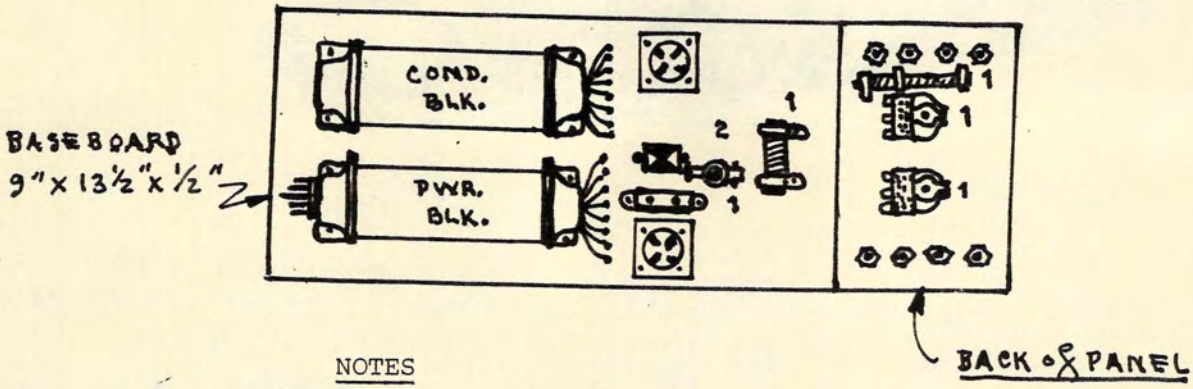




HAMMARLUND"Hi-Q" POWER UNIT LAYOUT, '28



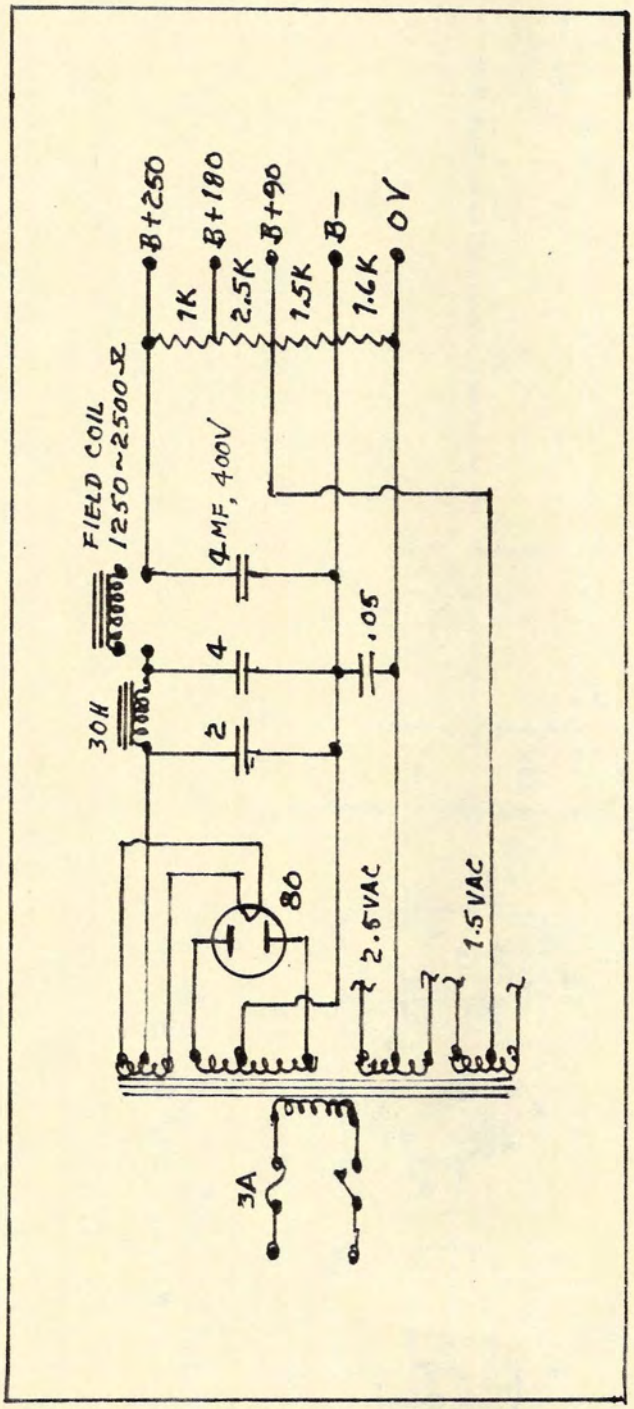




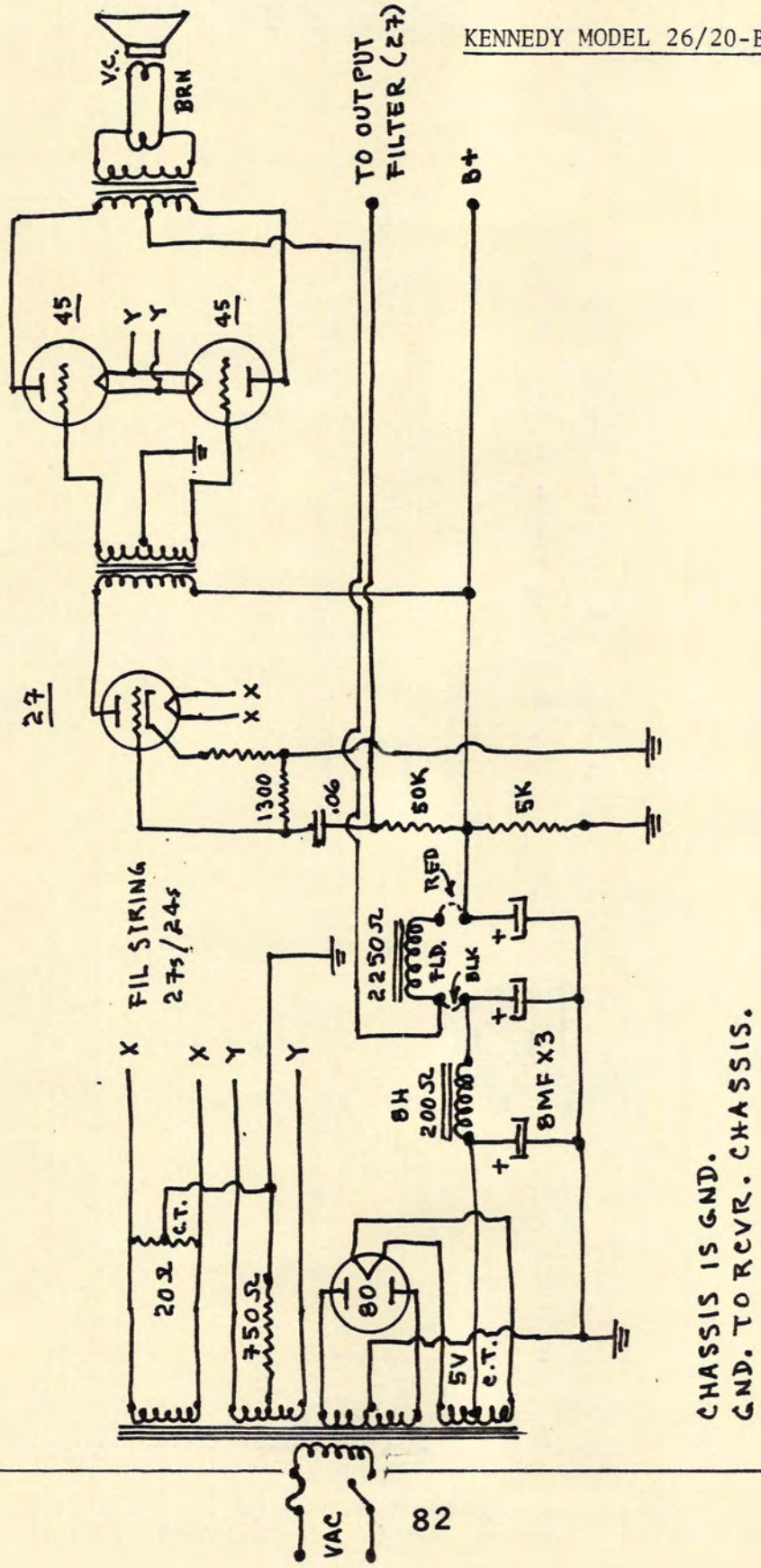
NOTES

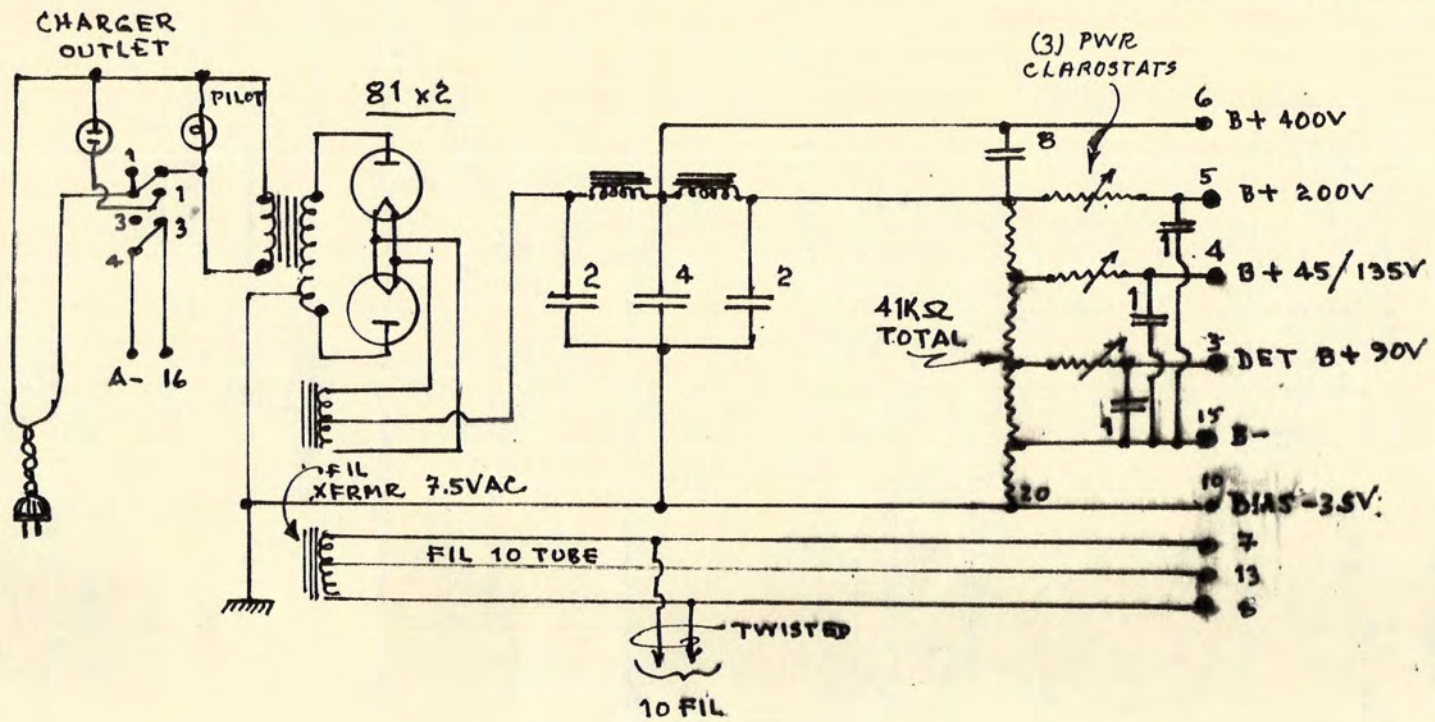
1. All Resistors = ELECTRAD Tubular types, 25W minimum capacity.
2. Leads go to a VR Type 7 Connector on set. (A Raytheon part number.)

ICA "CONQUERER" POWER SUPPLY, 1927



KENNEDY MODEL 26/20-B POWER UNIT





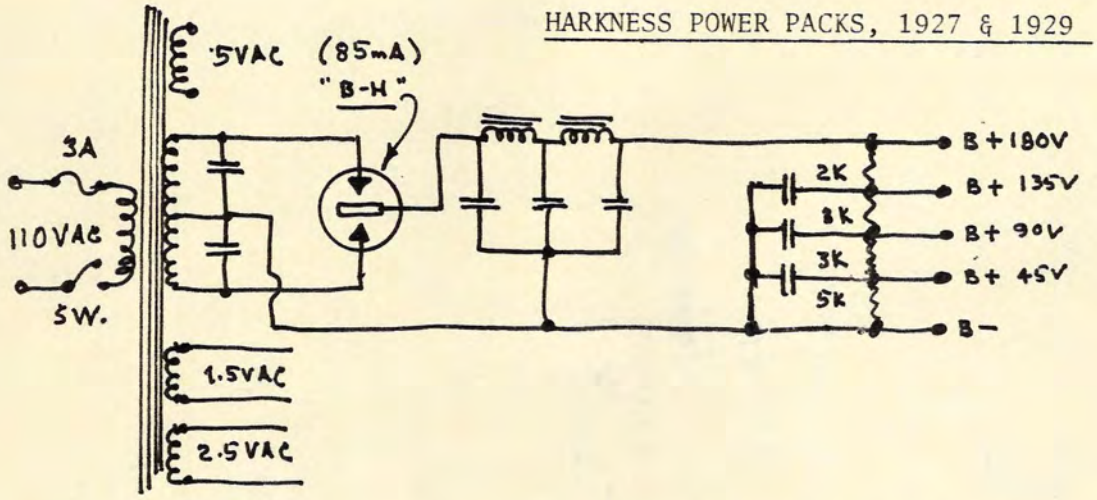
TERMINAL NOS. = Leutz numbers. 185 mA @ 450V.

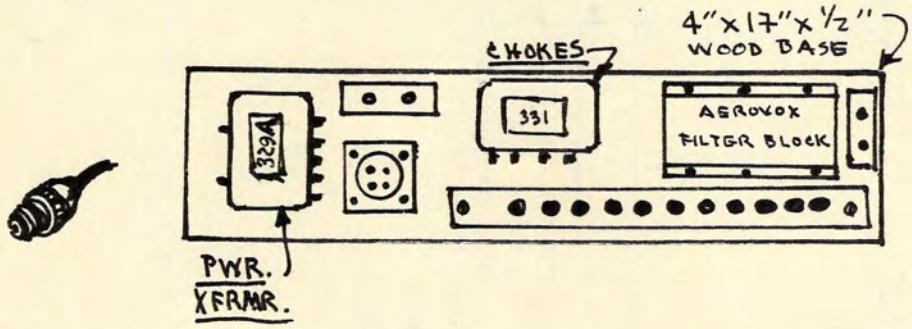
AUDIO OUTPUT = 7K mW w/ 10 & 40 tubes;
20K mW w/ 40 & 50 tubes (use only wirh a Dynamic Speaker, in which the speaker field serves as a filter choke.

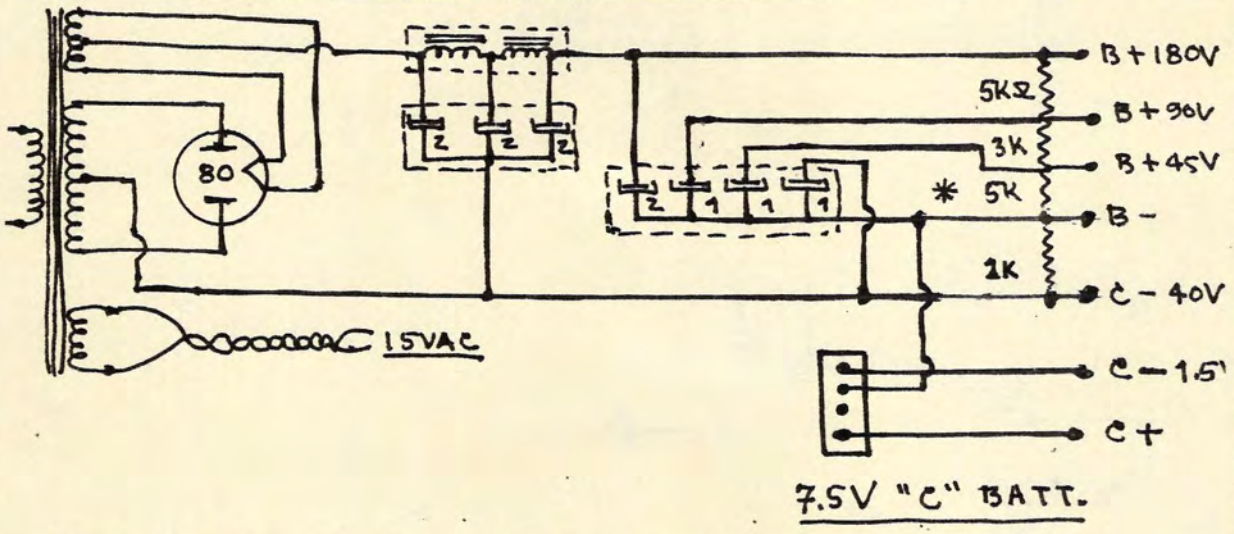
MILLIAMMETER (in set) = measures total Plate current, except for power tubes.

LEUTZ "SILVER GHOST" POWER SUPPLY, 1928

HARKNESS POWER PACKS, 1927 & 1929







NOTES:
1. Over-all Size = 4" x 19" x 7" High.
2. S-M "Unichoke" No. 331 used originally.
3. 1K Resistor is seperate from Power Resistor.

(*) = Divided at 3K ohms.

THE FIRST LOFTIN-WHITE CIRCUIT, 1926

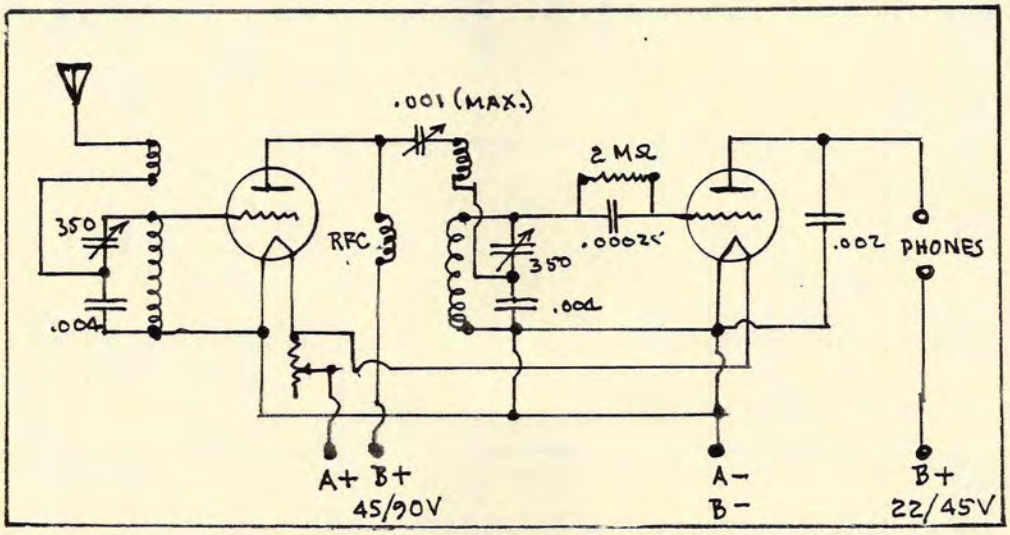
Loftin and White are remembered today, if at all, for their contributions to improving audio amplification and fidelity. However, a forgotten fact is that they entered Radio with a constant-coupled TRF, that did away with a peculiarity of the eraly TRFs - namely, RF amplification was never even over the entire broadcast band. This first contribution by Loftin-White will be found depicted in Volume II-A.

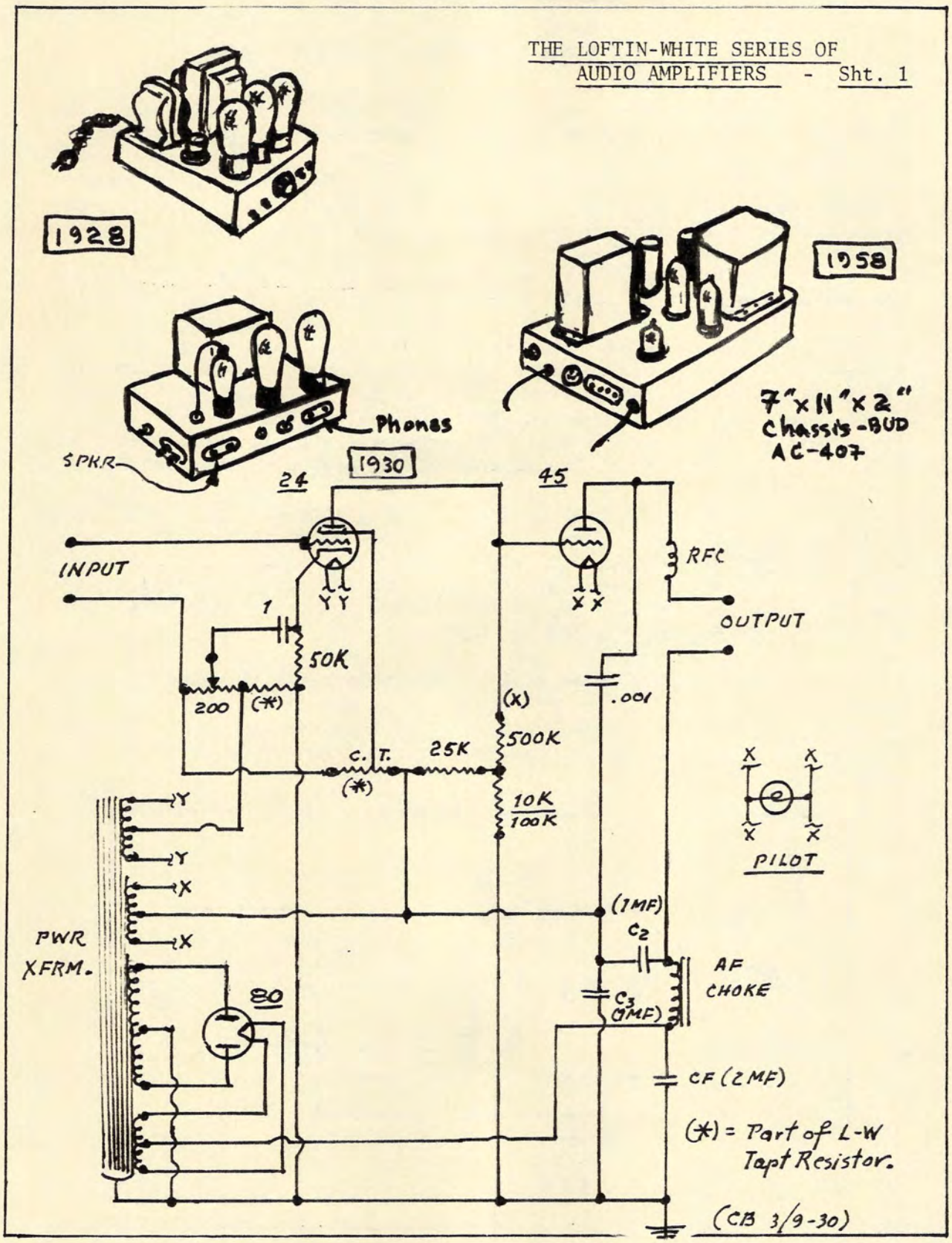
In 1926 they presented a paper at the IRE Conference which offered a circuit with greatly improved amplification characteristics.

Their applied theory was this: by combining electro-magnetic coupling with electro-static coupling through condensers, an even or constant transfer of energy from the PRI to the SEC could be obtained, over a wide range of frequencies. Their complete exposition of this advanced circuitry was published in the October, 1926, issue of the IRE Proceedings for that year. The schematic they presented is shown below.

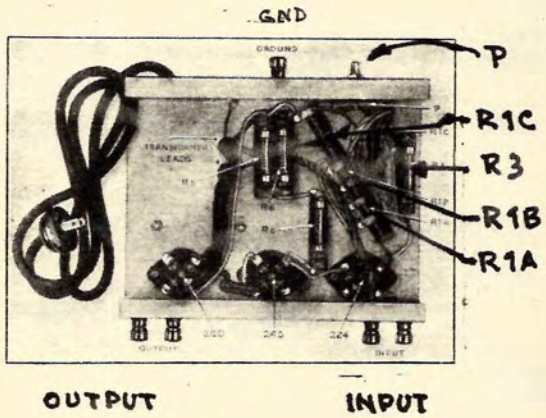
The midget variable placed in the plate circuit shifted the phase of the high frequencies being fed into the PRI coil so that there was no feed-back of energy occurring through the capacity of tube elements. The ANT and RF coils were standard for TRFs of the period, without being anything special, which obviously added to the practical uses of the concept for the average set-builder.

The two variables were placed in series with fixed mica condensers, with the GND of the PRI connected at the mid-point of the two variables. Having constructed this circuit, I can say that the original claims were justified, particularly between 550 KC and 1200 KC. Why not have a go at it yourself?

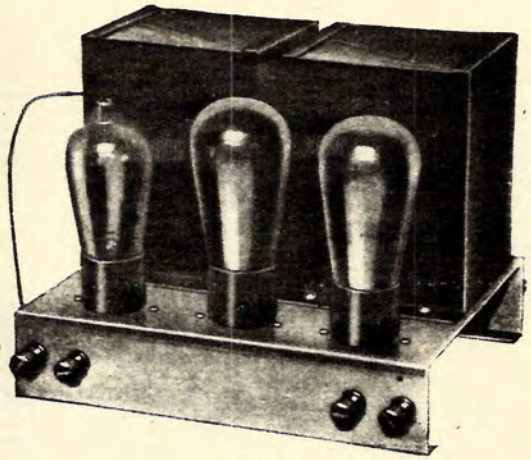


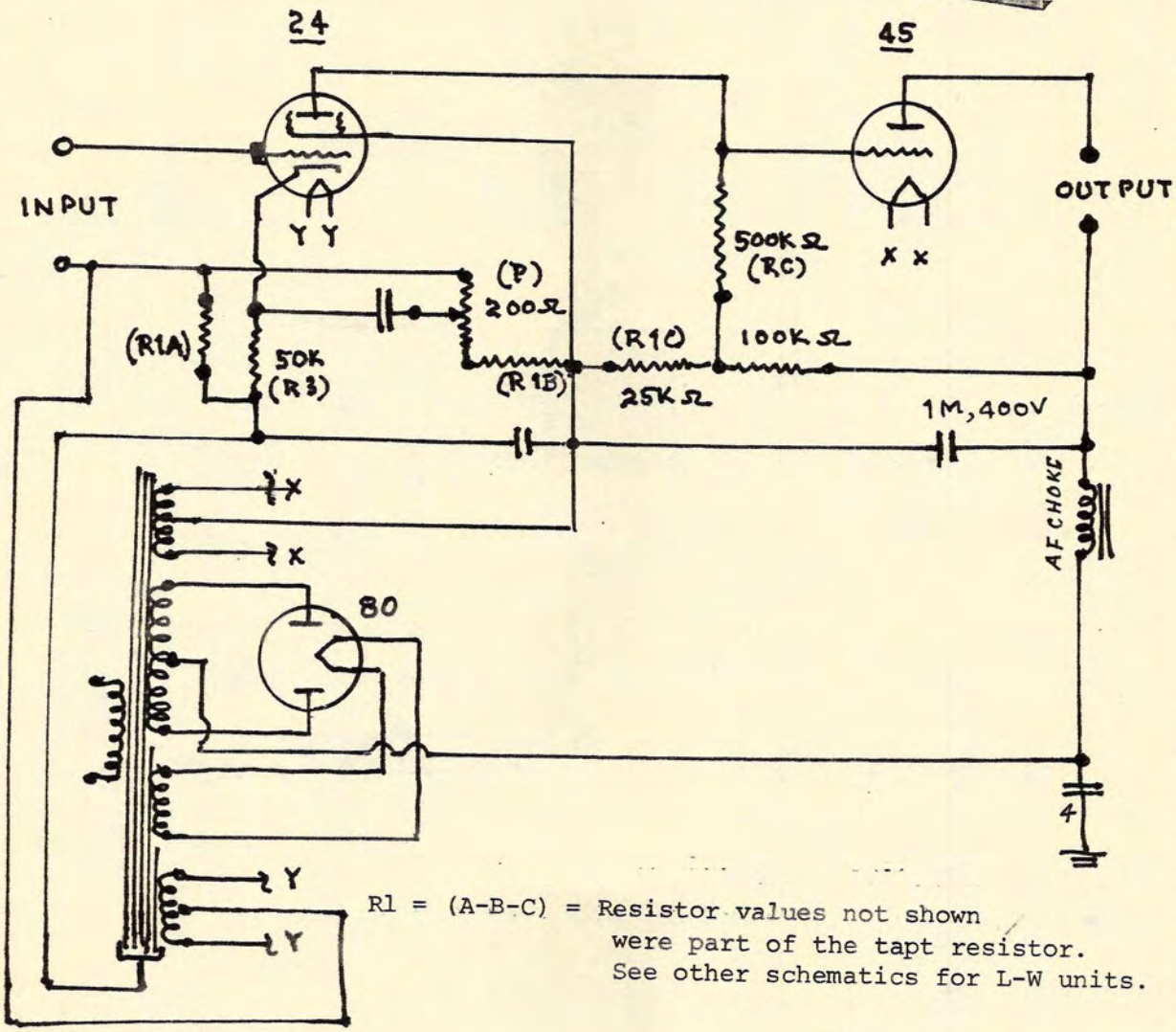

THE LOFTIN-WHITE SERIES OF
AUDIO AMPLIFIERS - Sht. 1
1928
1958
7"x11"x2"
Chassis-BUD
AC-407
Phones
SPKR
1930
24
45
INPUT
RFC
OUTPUT
1
50K
200
(*)
.001
(x)
500K
C. T.
25K
(*)
10K
100K
PILOT
PWR
XFRM.
(1MF)
C2
AF
CHOKE
80
C3
(1MF)
CF (2MF)
(*) = Part of L-W
Tapt Resistor.
(CB 3/9-30)

ELECTRAD-LOFTIN-WHITE AF AMPLIFIER



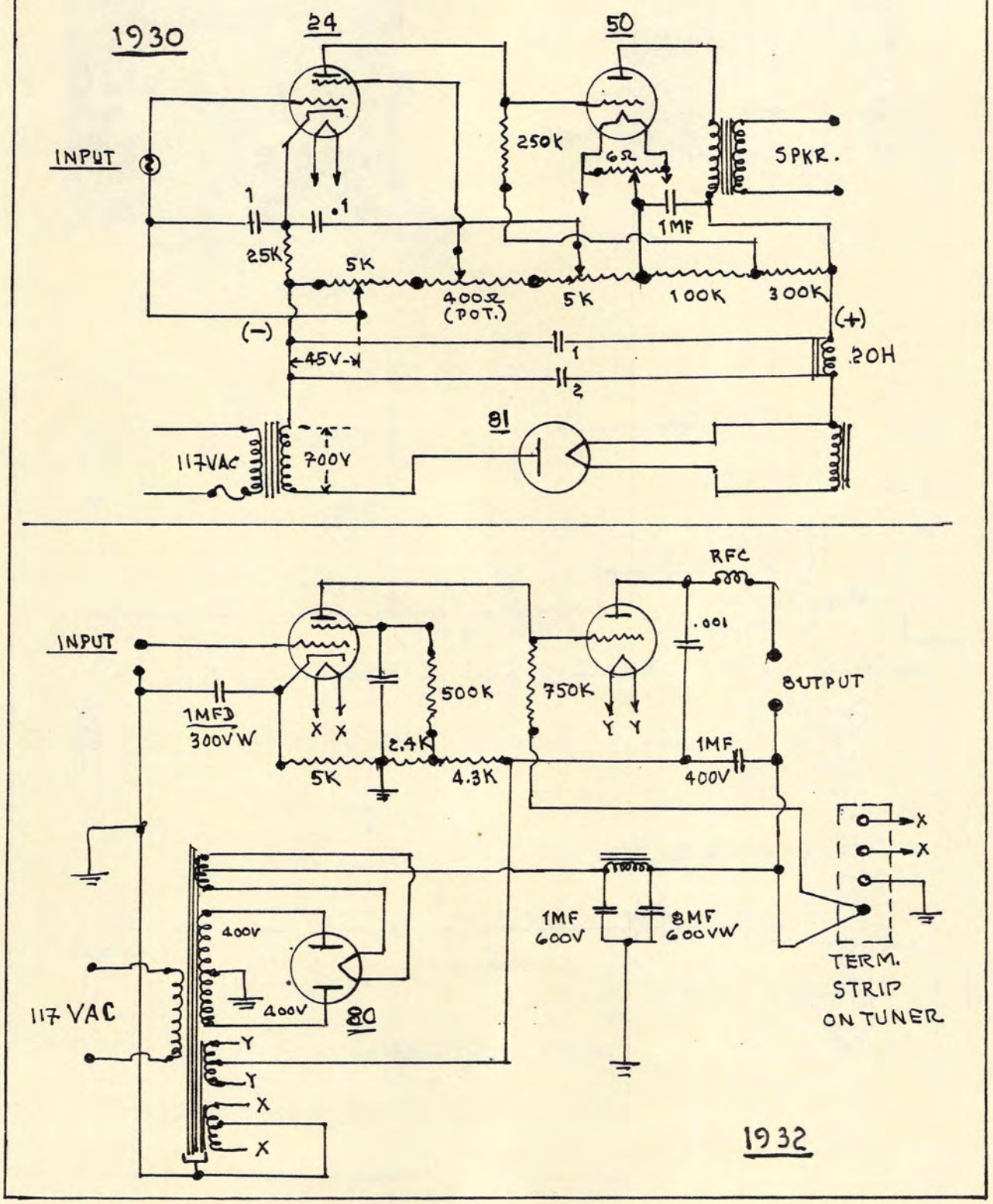
BOTT. VIEW





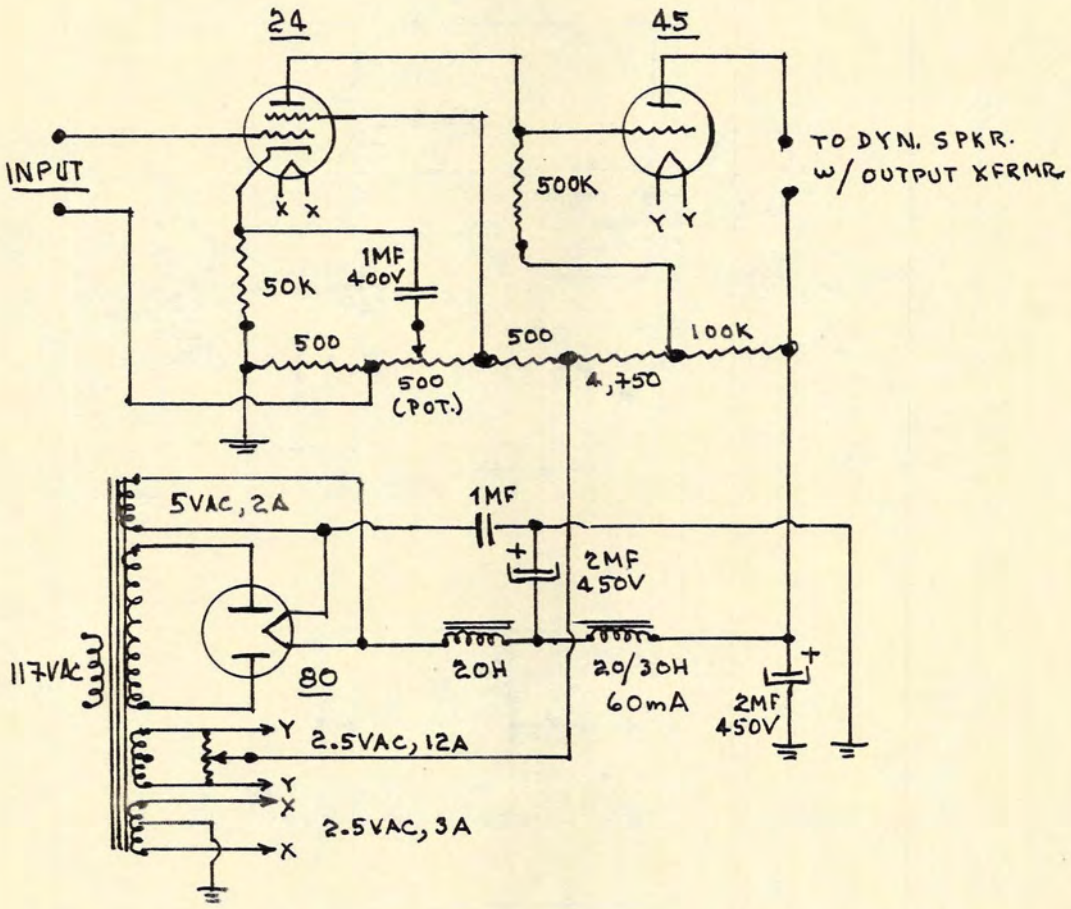
R1 = (A-B-C) = Resistor values not shown were part of the tapt resistor. See other schematics for L-W units.

LOFTIN-WHITE CIRCUITRY EVOLUTION, Sht.3



LOFTIN-WHITE CIRCUITRY EVOLUTION
(Sht. 4)

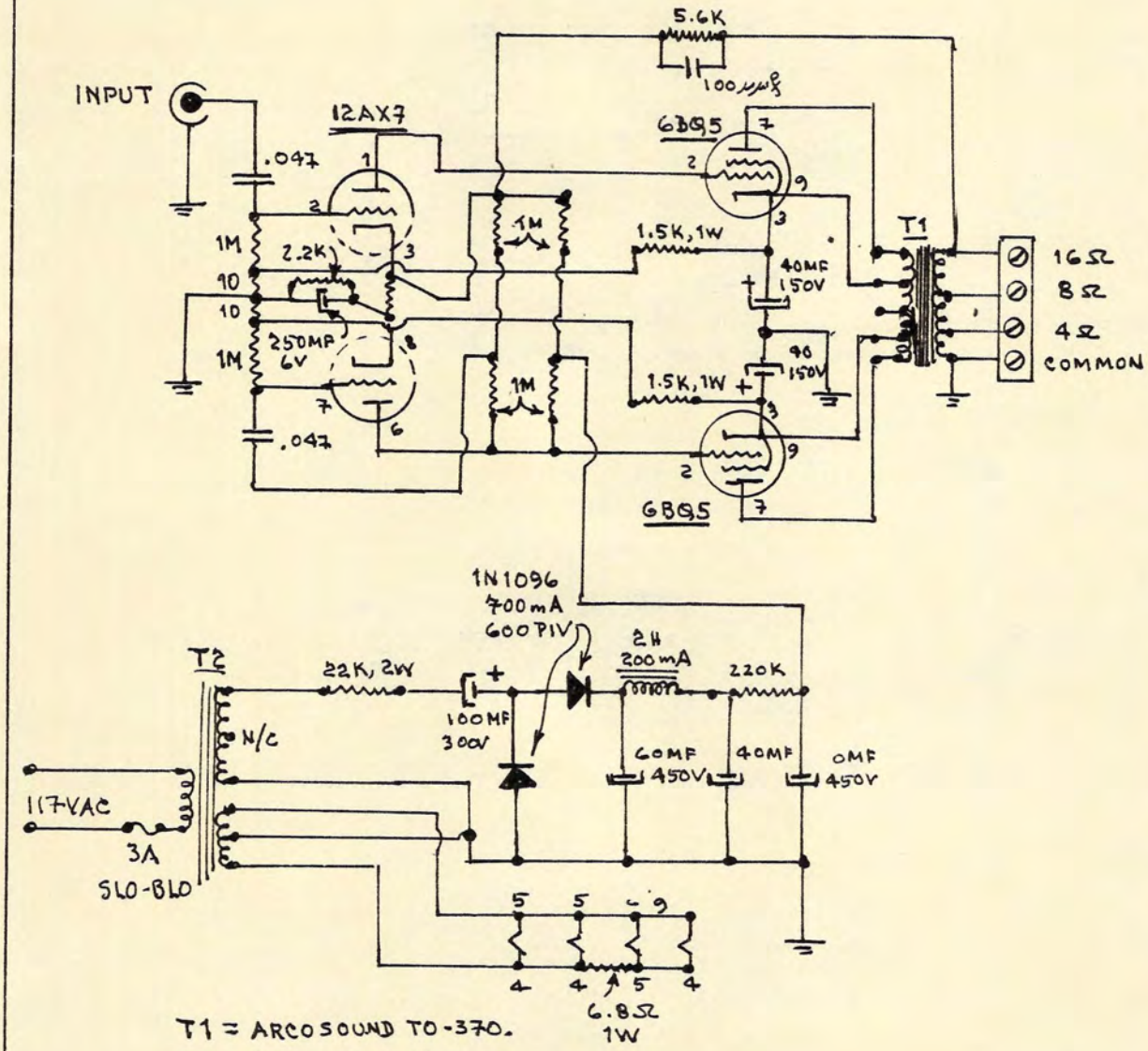
1933 VERSION



Chassis should be grounded. Installing a .1 to .25 MFD condenser connected between one side of the AC PRI and frame of Amplifier will usually act as a direct GND.

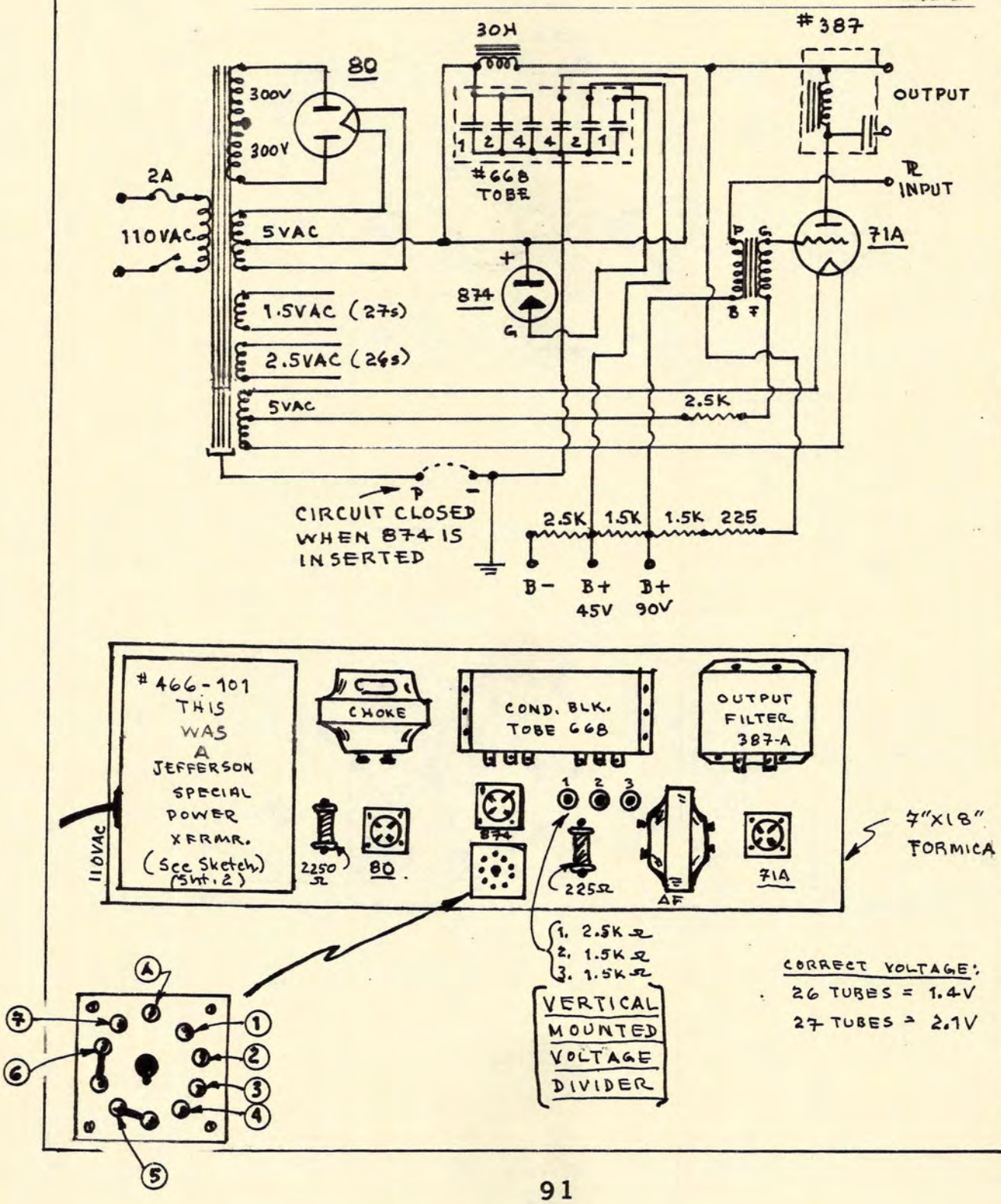
LOFTIN-WHITE CIRCUITRY EVOLUTION, Sht.5

1958 VERSION

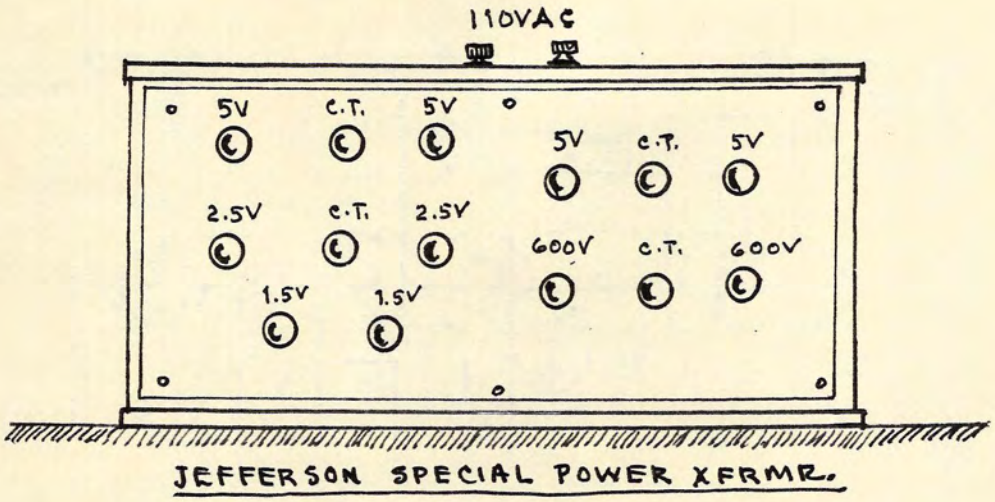


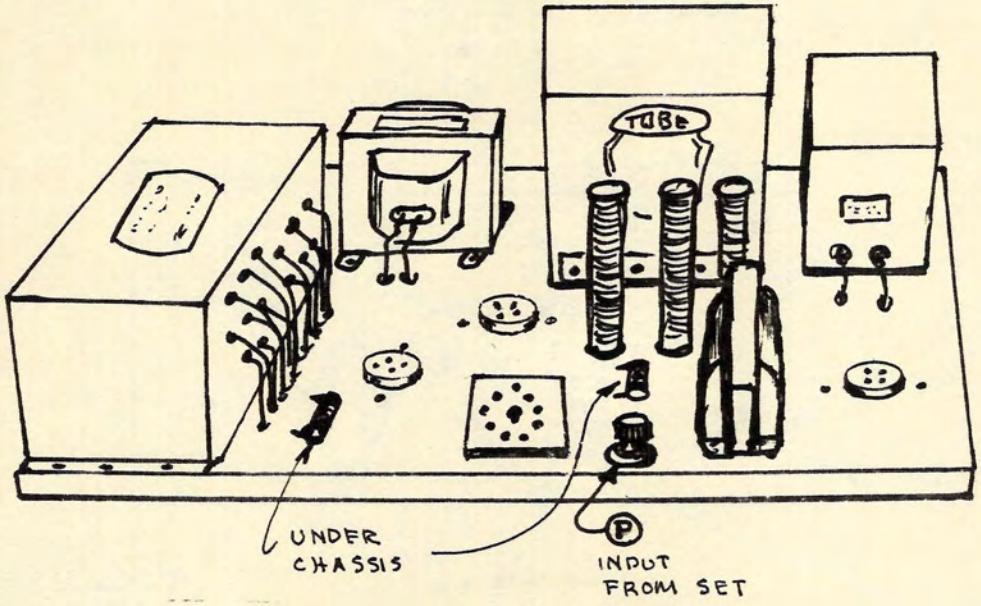
To my knowledge, this was the last variation of the Loftin-White amplifiers. While it doesn't really fit into a work on vintage radio, it does, none-the-less, place a period. Designer unknown.

MADISON-MOORE "ONE-SPOT" PWR. UNIT
(1928) (Sht. 1)



MADISON-MOORE "ONE-SPOT" POWER SUPPLY, 1928
(Sht. 2)



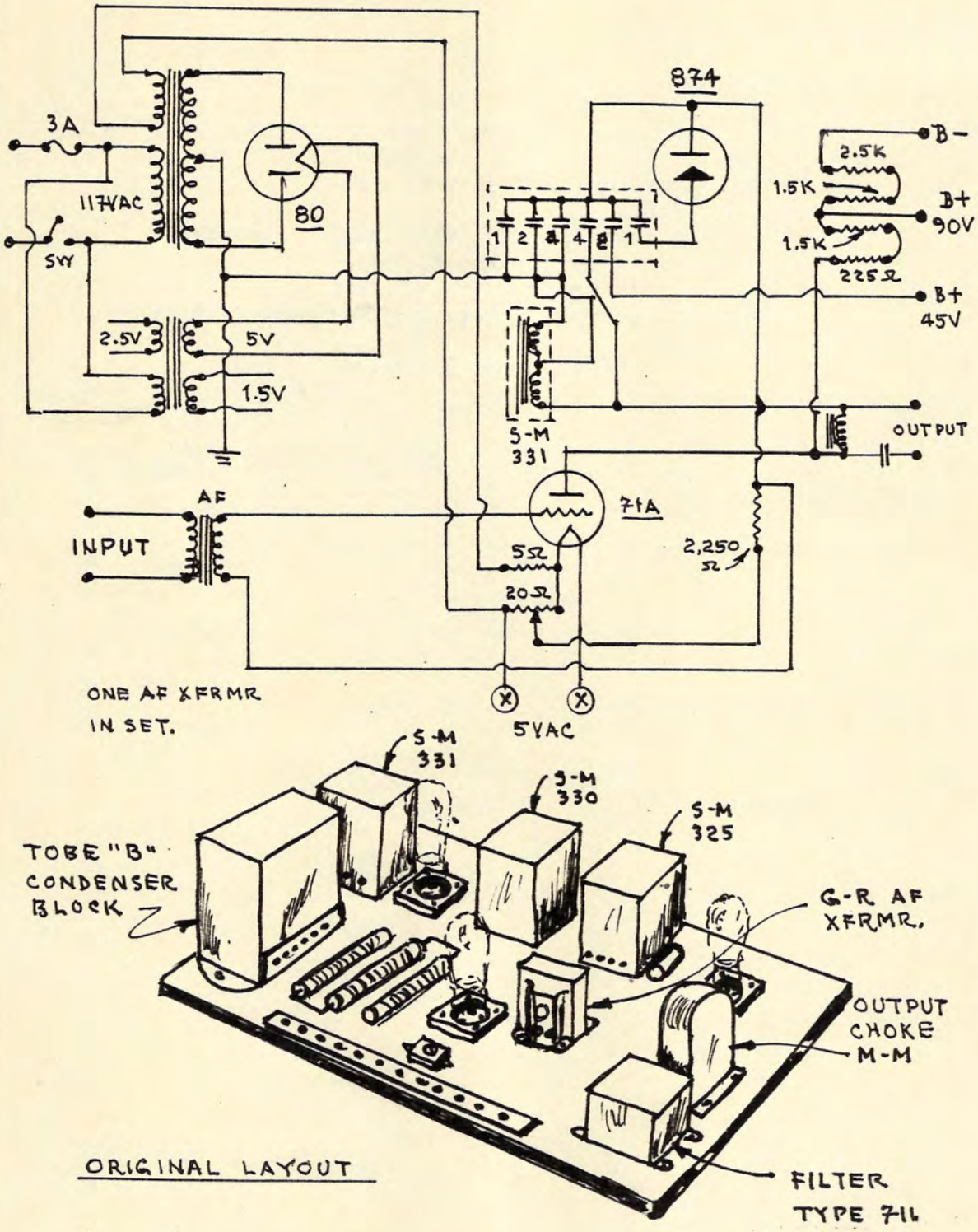


MADISON-MOORE "ONE-SPOT" PWR. SUPPLY
(1928) (Sht. 3)

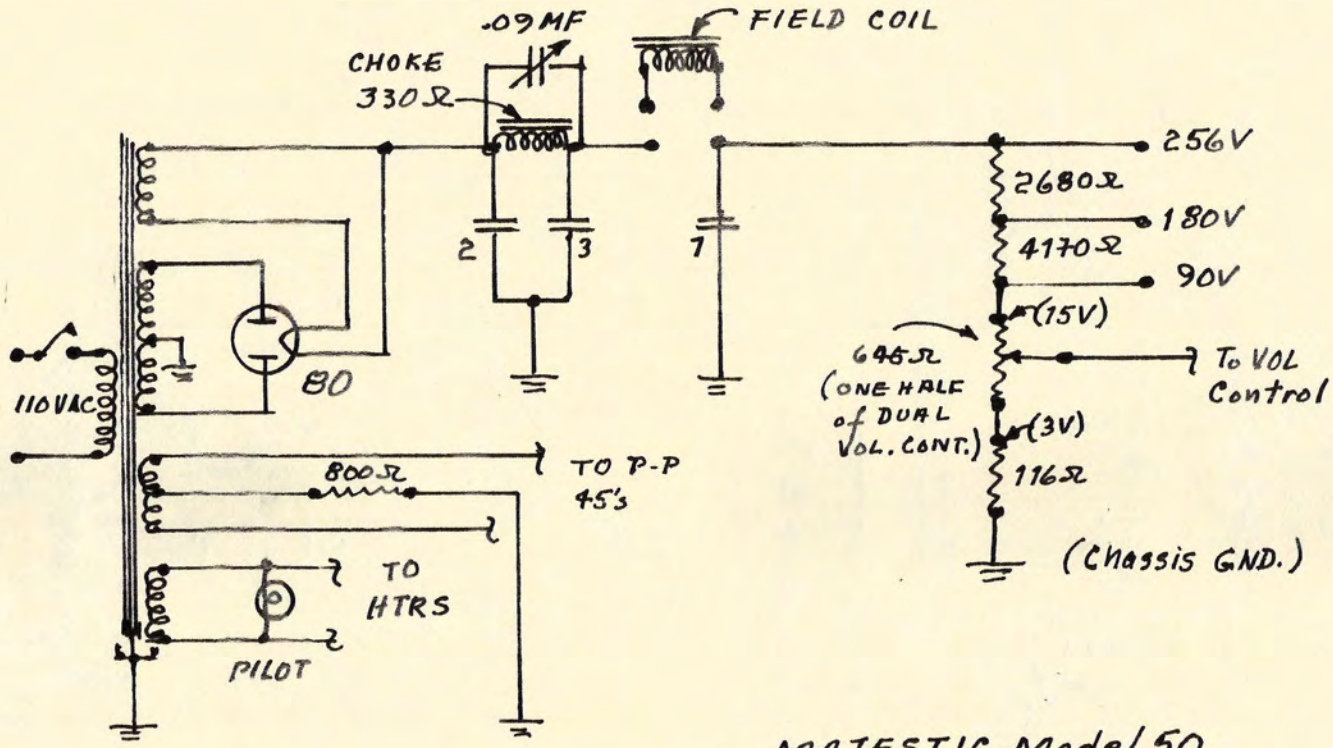
General Notes;

1. The HAGEL 10-point power plug with matching double plug cable used originally.
2. The 874 voltage regulator also used a HAGEL socket. (The HAGEL name is barely remembered today - they were a mid-west outfit that flirted with radio components, and then gave it up.)
3. Sub-panel brackets were (3) KARAS or BENJAMIN makes.
4. AF transformer = Genral Radio #285-D.
5. Power Chokes = Jefferson #466-130.
6. The vertically mounted voltage dividers were WARD LEONARD.
7. Tube voltages:
   26 Tubes = 1.4V on filaments.
   27 Tube = 2.1VAC on filament.
   If 71A tube is used, 5.0VAC on filament.
8. AF Output filter = Jefferson #387-A.
9. Jefferson power transformer #466-101 wire colour-codes:
   Blue = 45V
   Slate = 90V
   Orange = 2.5VAC
   White = 2.5VAC
   Red/Pink = 1.5VAC
   Black/Brown = 1.5VAC
   Green = GND; C-.
   Yellow = B-
10. Multiple condenser block = TOBE #668.

MADISON-MOORE POWER SUPPLY, 1928



ORIGINAL LAYOUT

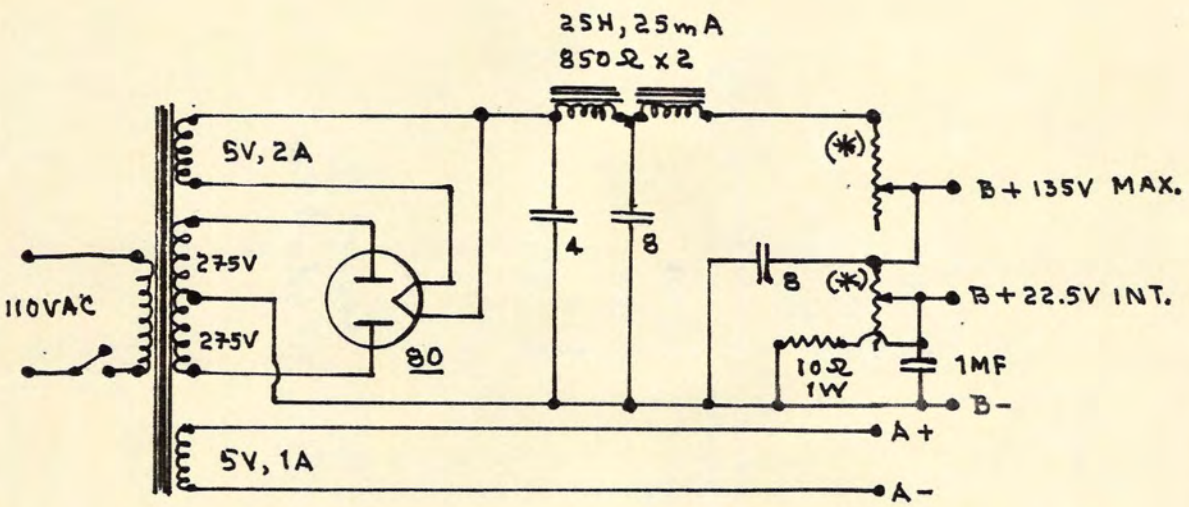


MAJESTIC Model 50
B-SUPPLY, 1930

NOTE:
The .09MF tunes the choke.

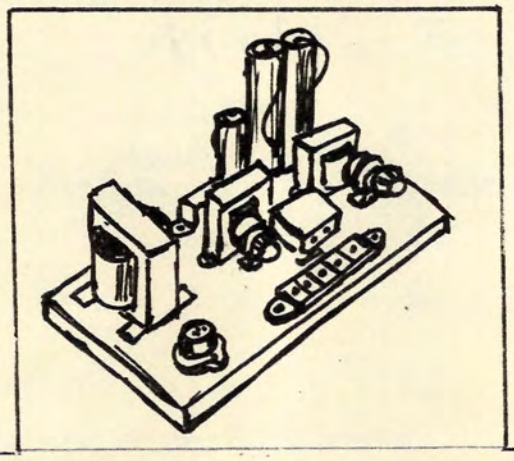
"MAJESTIC" Model 50 B-SUPPLY, 1930

"MEGADYNE" POWER SUPPLY, 1933
(Gernsback)



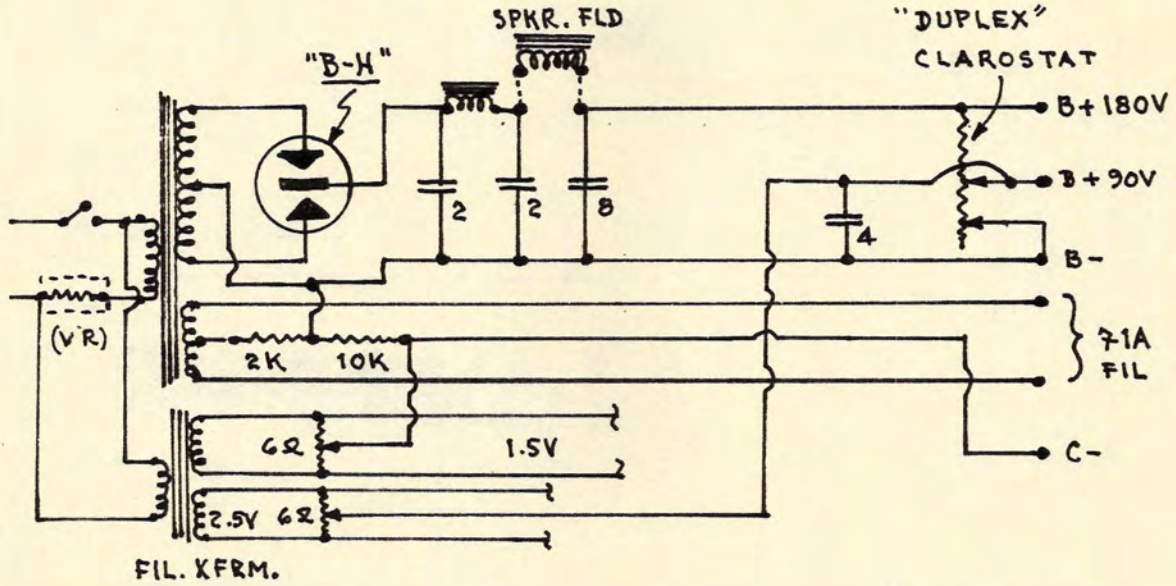
(*) = STD. CLAROSTATS

NOTES:
1. Polymet power xfrmr. & filters used originally.
2. Electrolytics mounted on hat-sexion metal strip.
3. Clarostats mounted on "L" brackets.
4. Baseboard = 7.5" x 11½" x 5/8".
5. Electrolytic bracket = .75" x 5.5" x 3/32", raised .75" above baseboard.

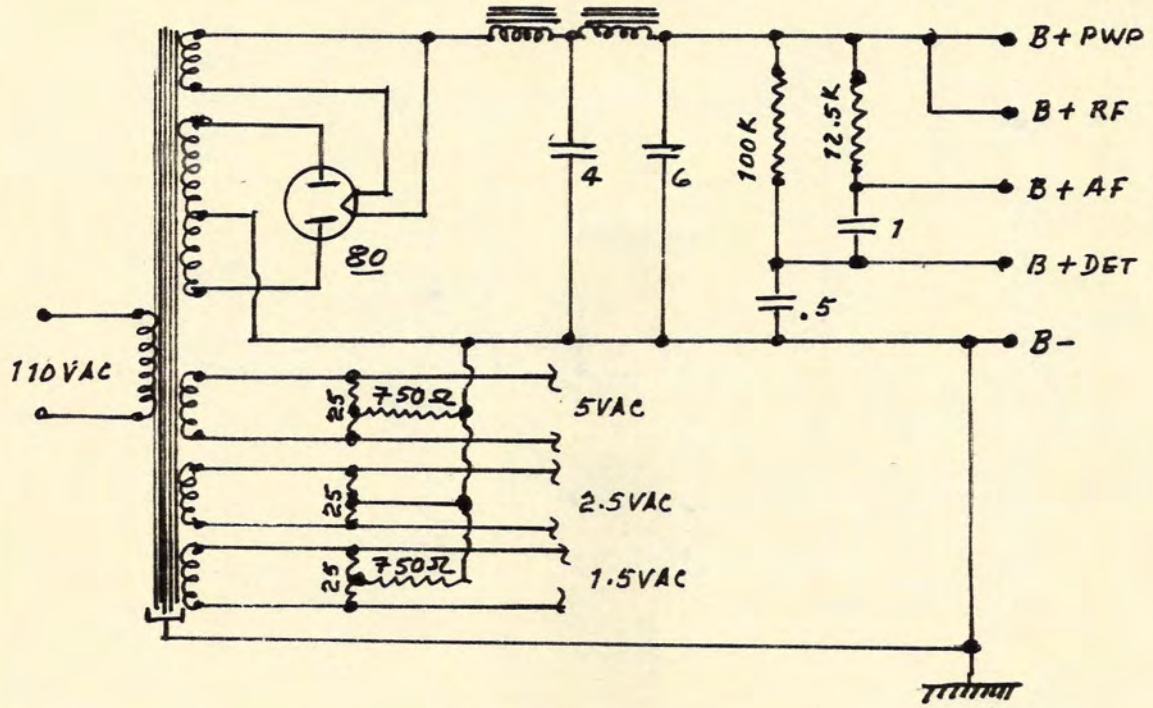


MISCELLANEOUS POWER SUPPLIES - Sht. 1

A-K MODEL 37 Pwr. Unit, 1928

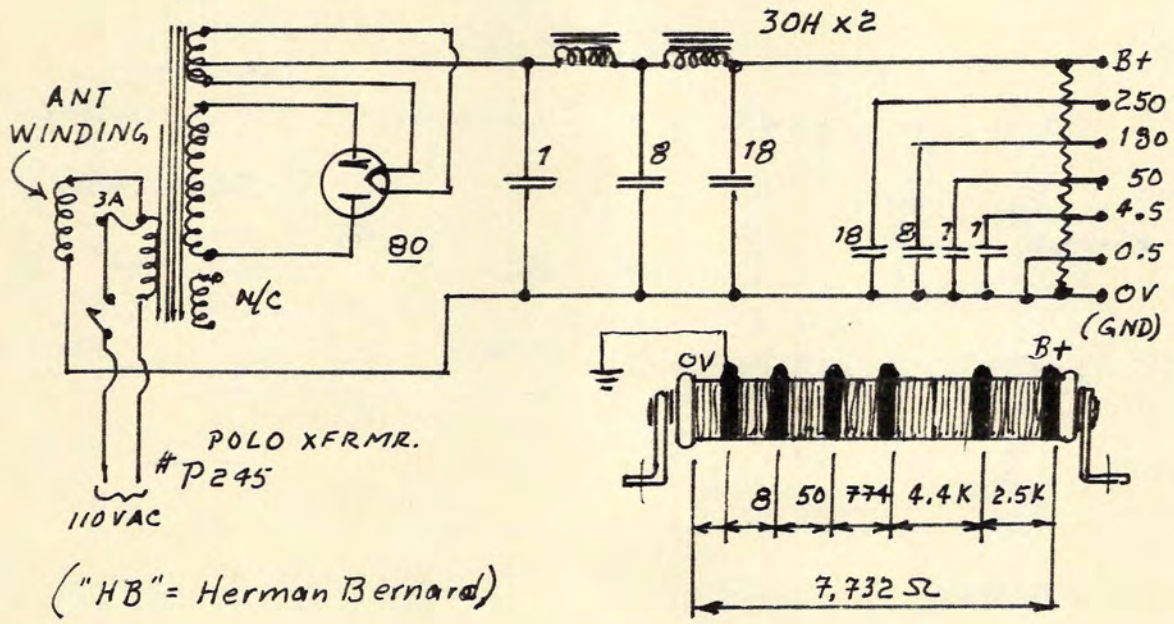


GILFILLAN BROTHERS, 1928

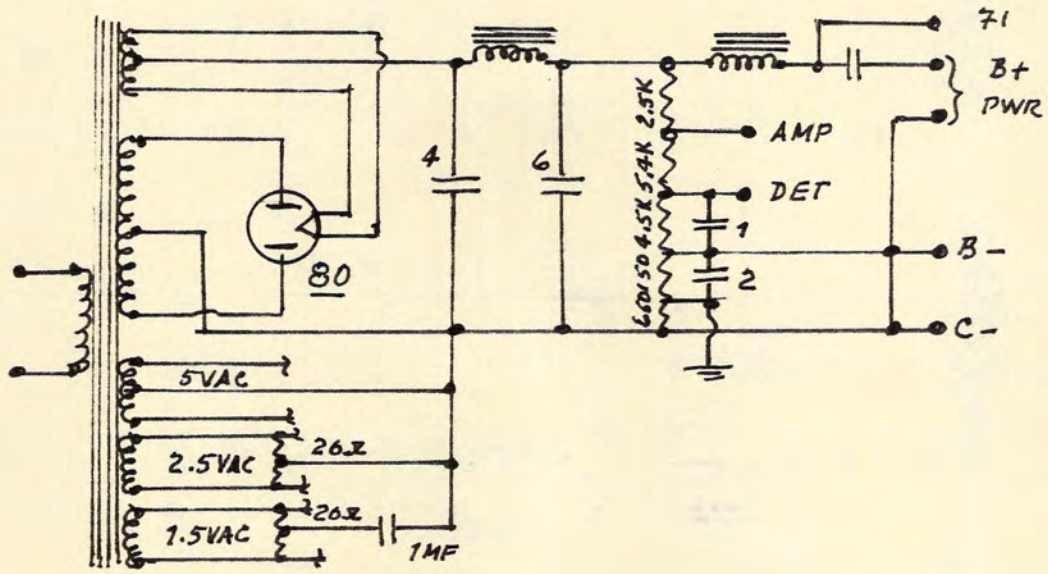


MISCELLANEOUS POWER SUPPLIES, Sht. 2

"HB" COMPACT POWER SUPPLY, 1926

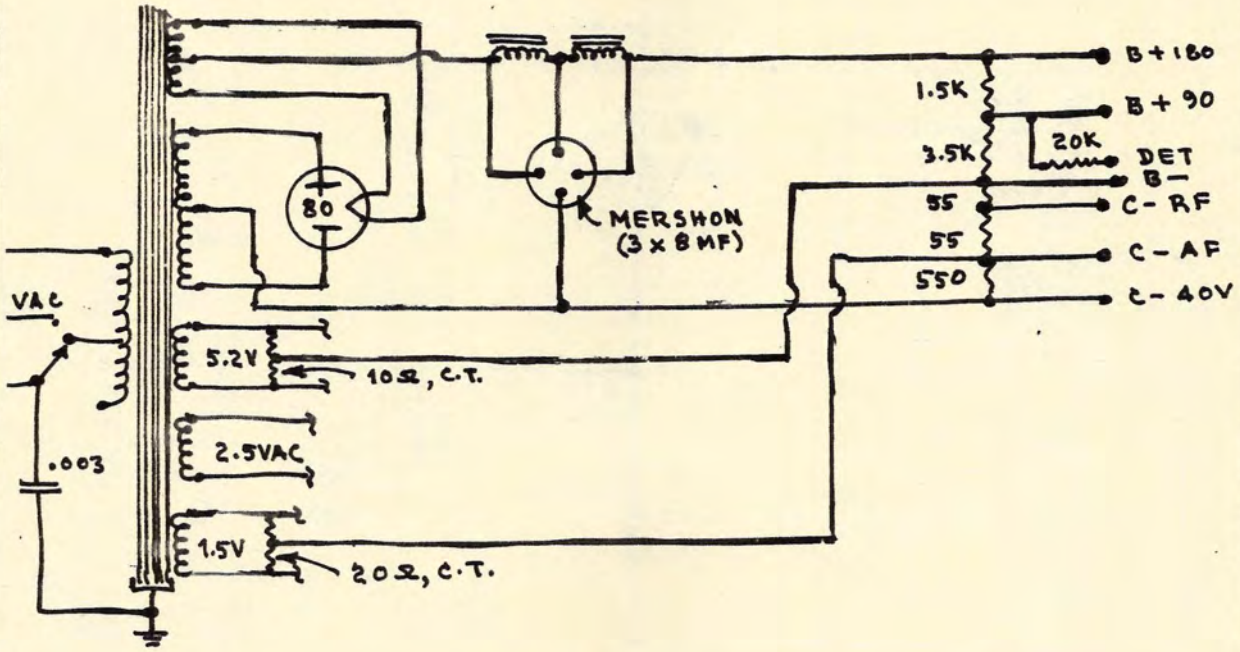


SPLITDORF POWER SUPPLY, 1928

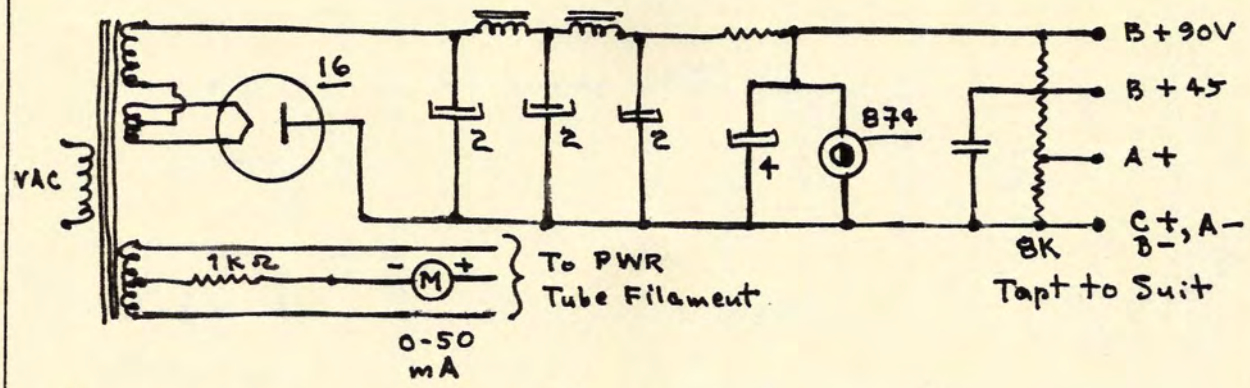


MISCELLANEOUS POWER SUPPLIES, Sht. 3

CROSLEY "BANDBOX" POWER UNIT, 1928



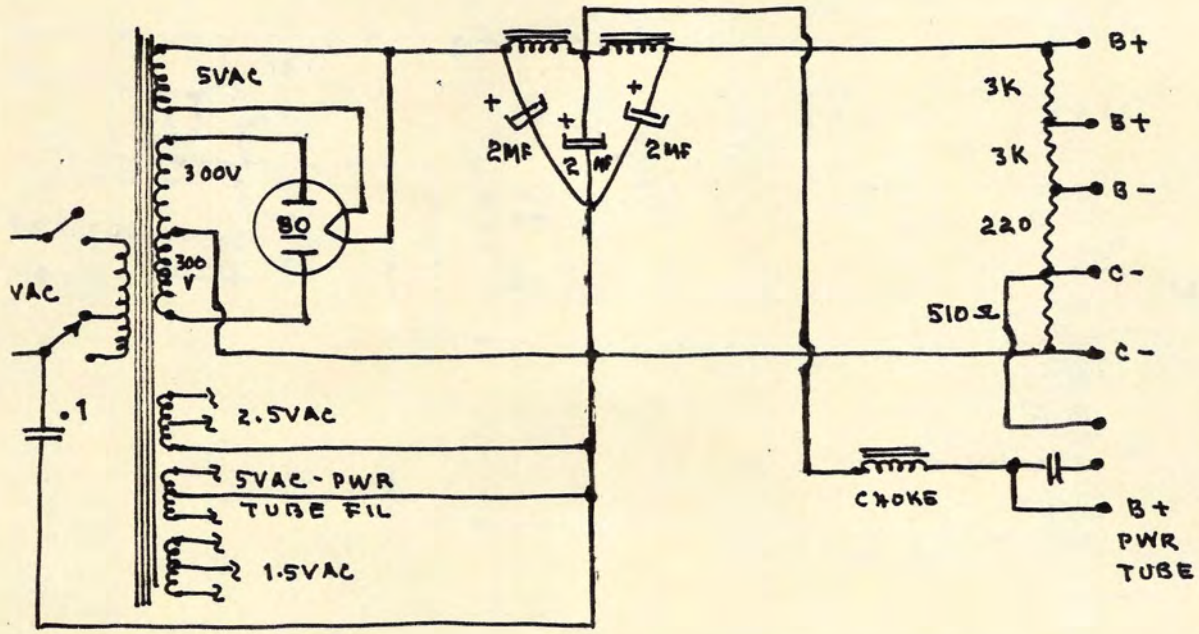
16-TUBE RECTIFICATION CIRCUIT, '26



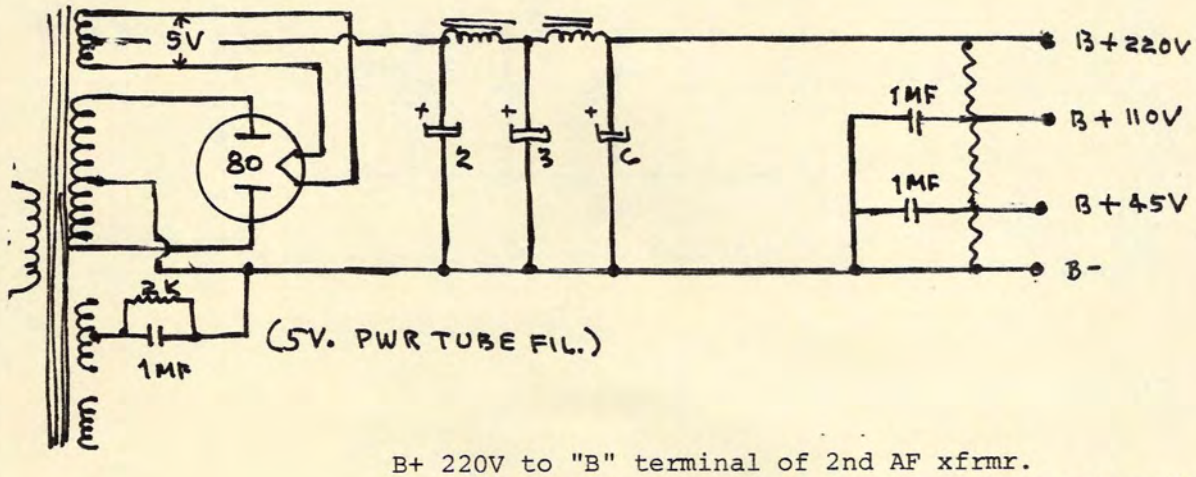
(56 Tube May Also Be Used.)

MISCELLANEOUS POWER SUPPLIES, Sht. 4

KOLSTER B-C ELIMINATOR, 1928



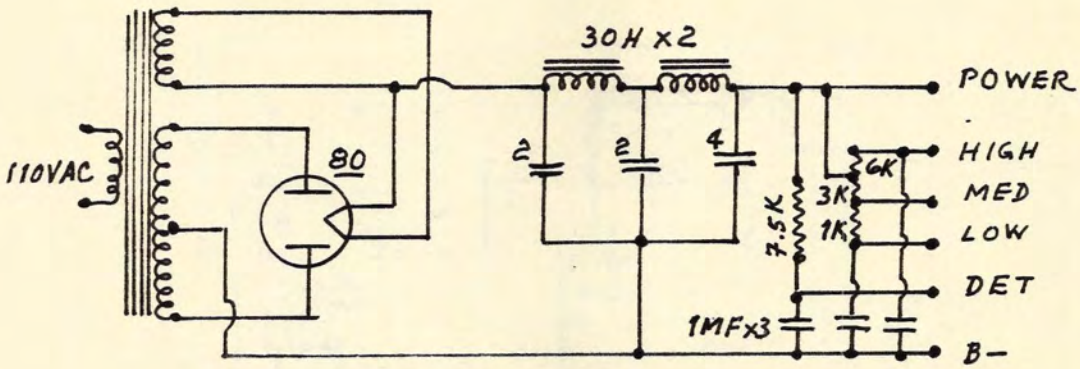
MOHAWK POWER SUPPLY, 1928



B+ 220V to "B" terminal of 2nd AF xfrmr.
B+ 110V to "B" terminal of 1st AF xfrmr. & RF coils.

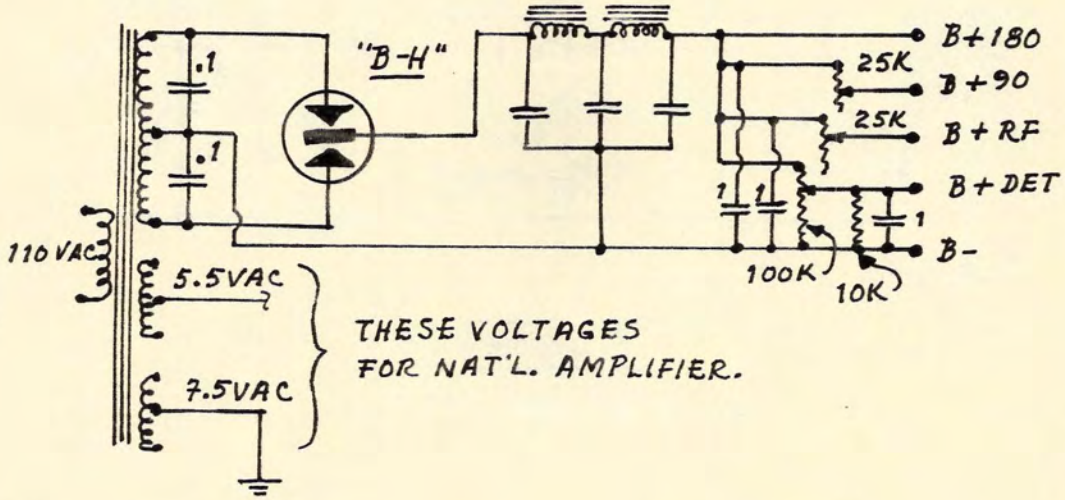
MISCELLANEOUS POWER SUPPLIES, Sht. 5

BALKITE TYPE B-180, FORM B, 1927

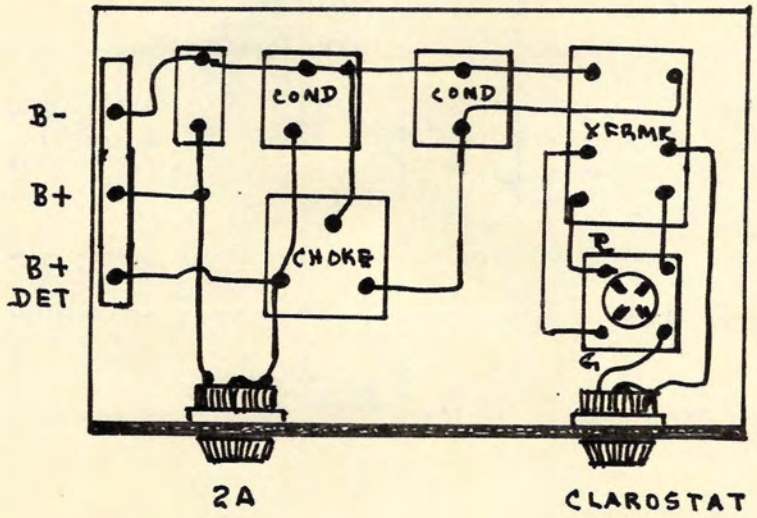


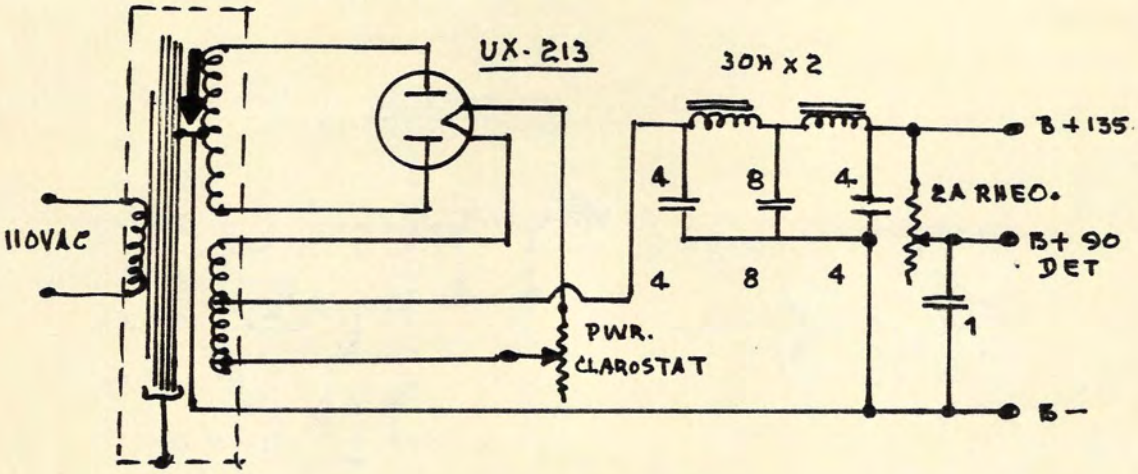
B-180, FORM B

NATIONAL "B"-ELIMINATOR, 1928



MARLE "B"-ELIMINATOR, 1926

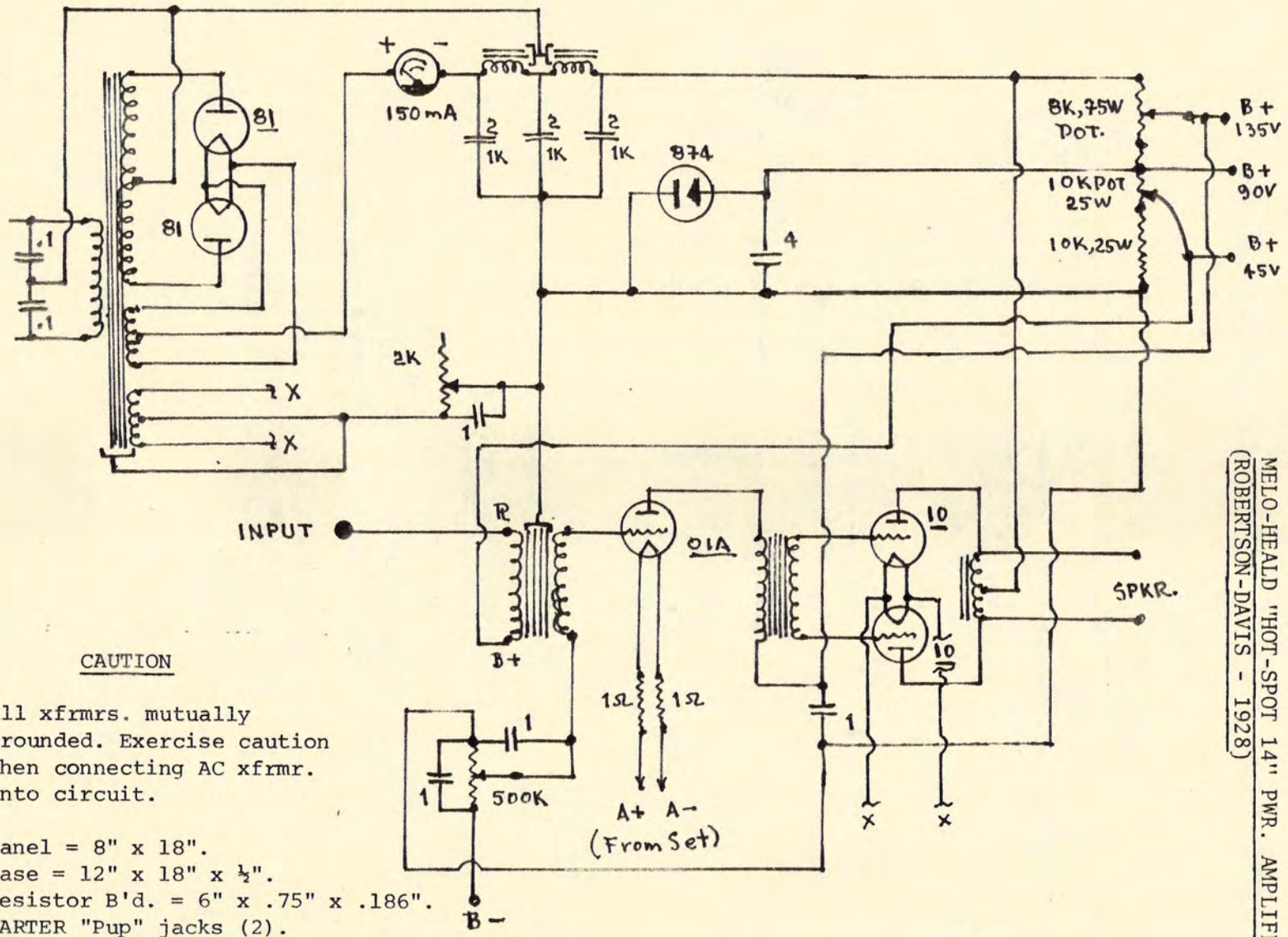




CAUTION

DO NOT GROUND SET!

MARLE XFRMR. # 213.
MARLE CHOKES C-2.



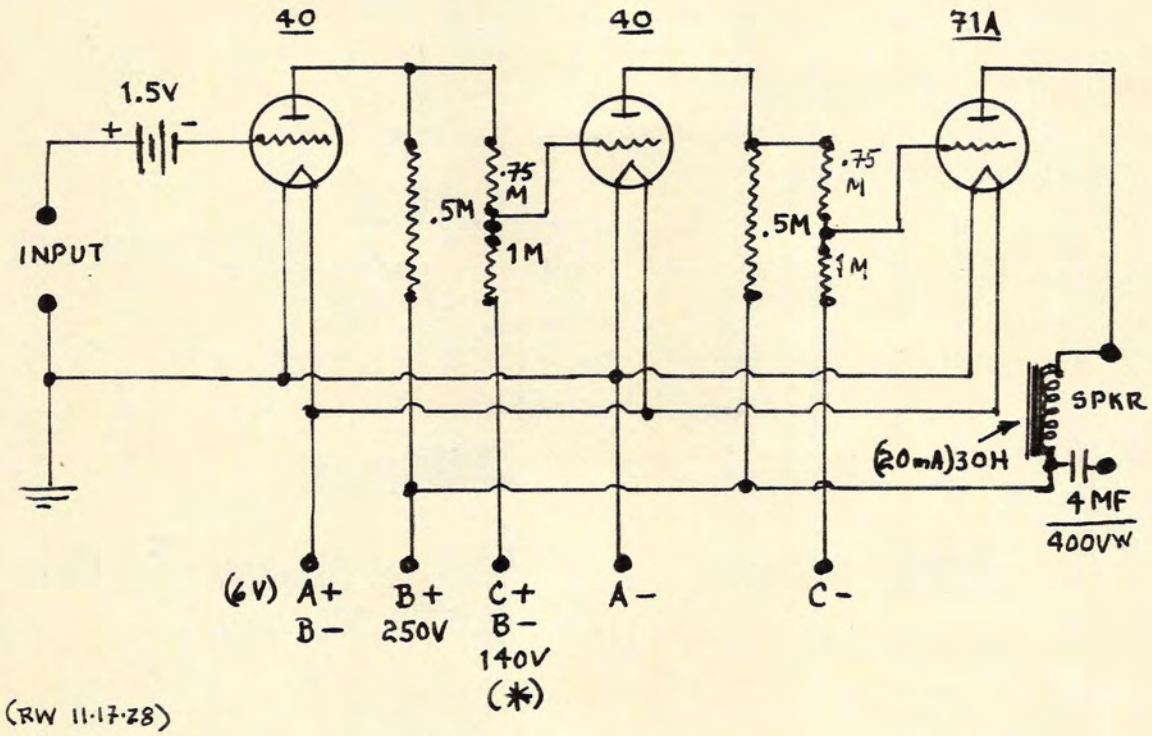
MELO-HEALD "HOT-SPOT 14" PWR. AMPLIFER
(ROBERTSON-DAVIS - 1928)

CAUTION

All xfrmrs. mutually grounded. Exercise caution when connecting AC xfrmr. into circuit.

Panel = 8" x 18".
Base = 12" x 18" x ½".
Resistor B'd. = 6" x .75" x .186".
CARTER "Pup" jacks (2).

THE MORGAN NON-REACTIVE AMPLIFIER, 1928



(*) = The value of the "B" voltage must be adjusted until the bias on the tube is correct for the plate voltage used.

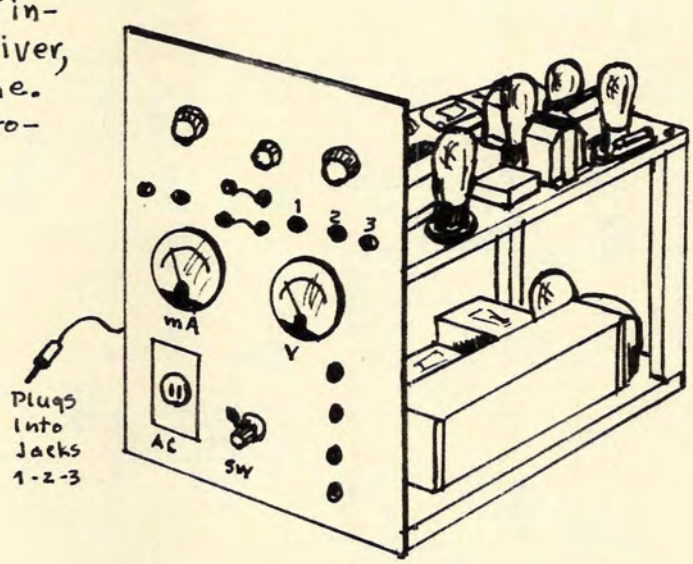
All voltages must be supplied from seperate batteries.
Unit will NOT work from a B-Eliminator.
Power Amplification = 55.2 Transmission Units (q.v.).

"Prof. Joseph Morgan" was the pen-name of a scientist and Chief Engineer of the International Resistor Corporation (IRC).This unit is capable of operating quite as any other R-C amplifier, but is extremely critical in all adjustments.

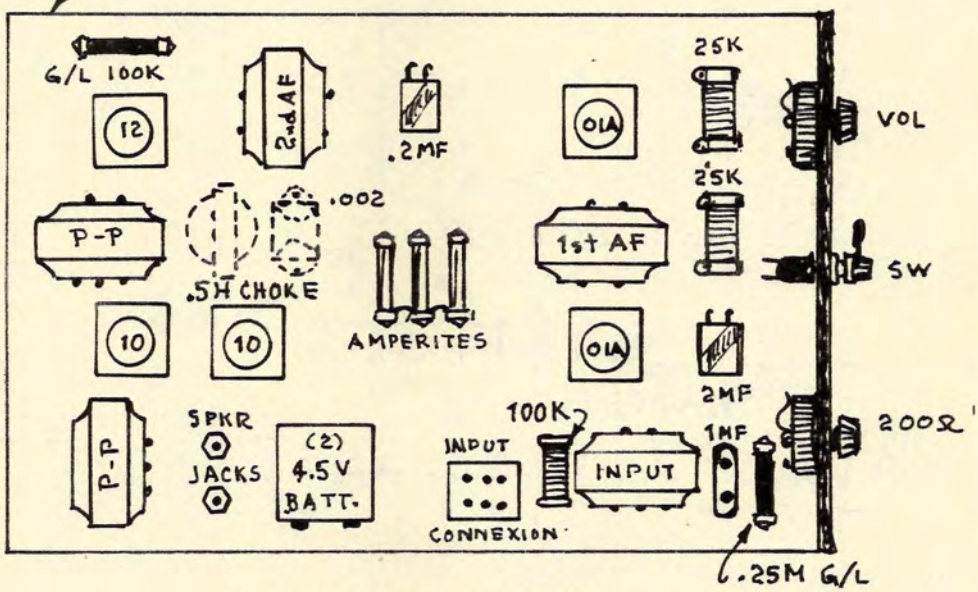
MULTIPLE AUDIO AMPLIFIER, 1928; Sht. 1

An extremely powerful audio amplifier, for inputs from radio receiver, phonograph, microphone. Will drive two electro-dynamic speakers

25 W output.

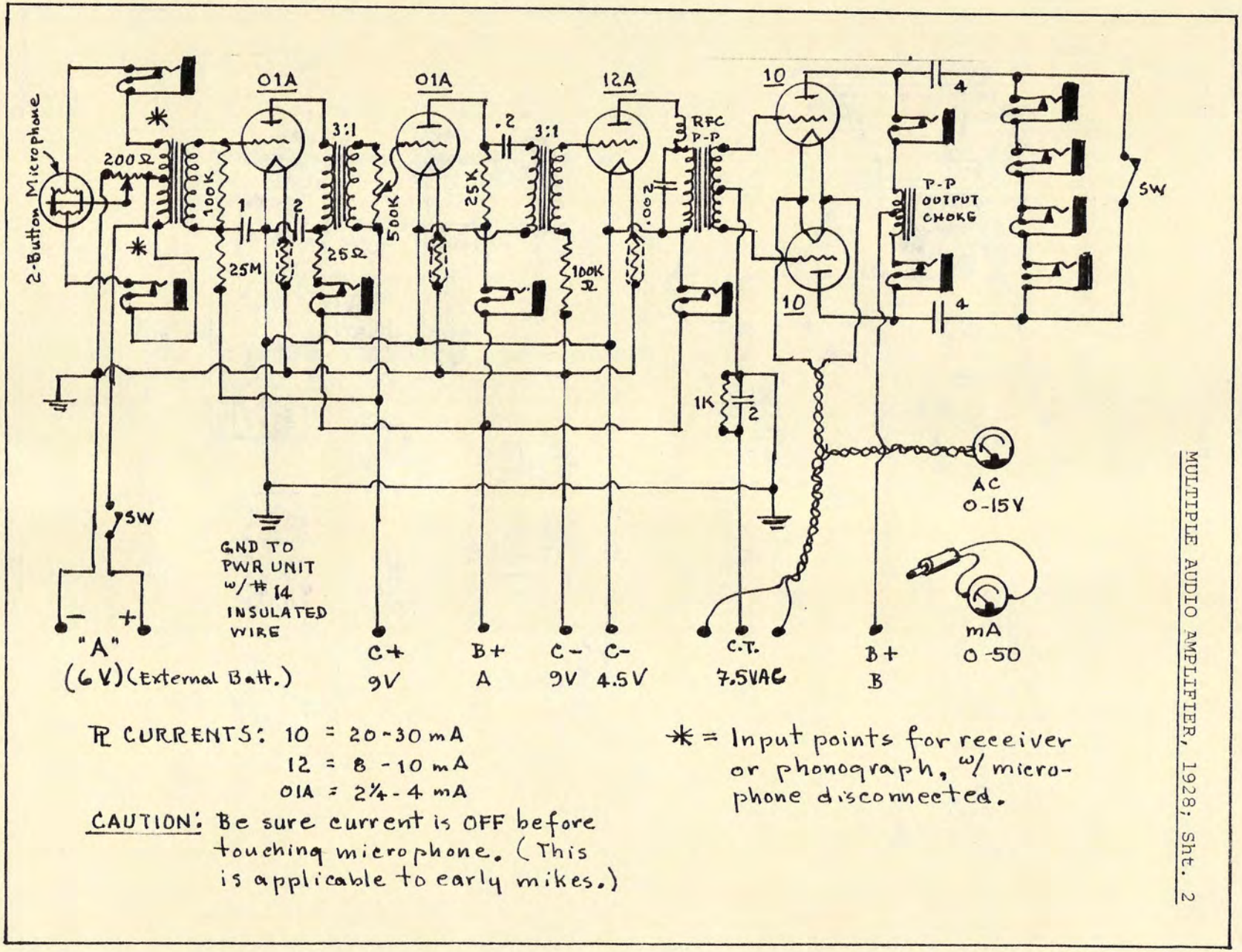


12"x16"x1/2"



TOP DECK LAYOUT
(Audio Sexion)

(R 7-28)



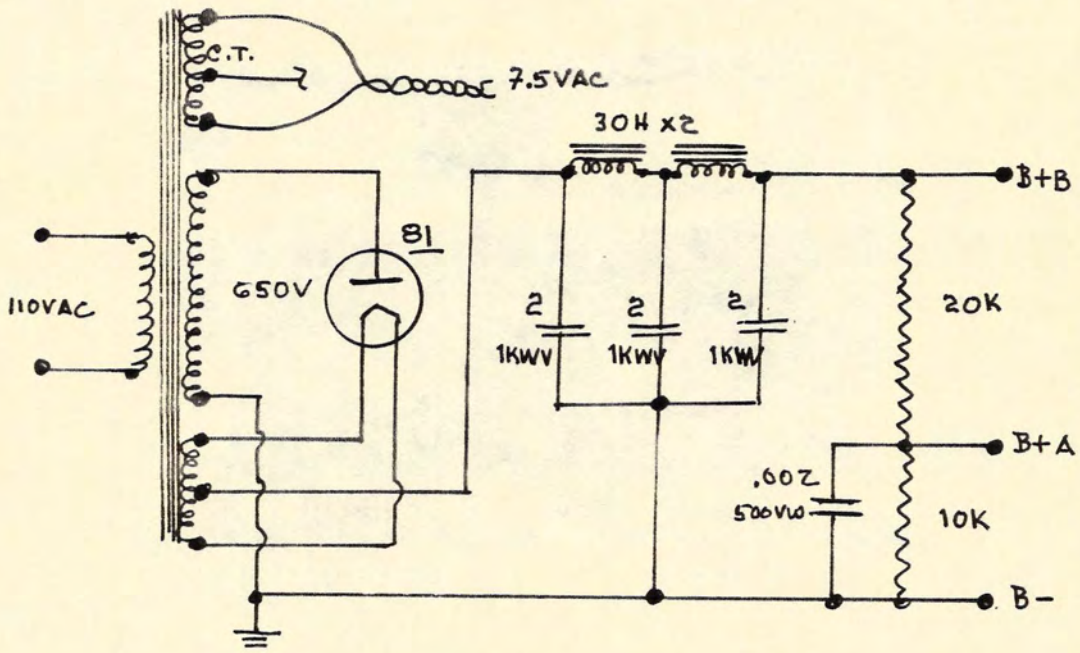
TR CURRENTS: 10 = 20-30 mA
12 = 8-10 mA
01A = 2¼-4 mA

CAUTION: Be sure current is OFF before touching microphone. (This is applicable to early mikes.)

* = Input points for receiver or phonograph, w/ microphone disconnected.

MULTIPLE AUDIO AMPLIFIER, 1928; Sht. 2

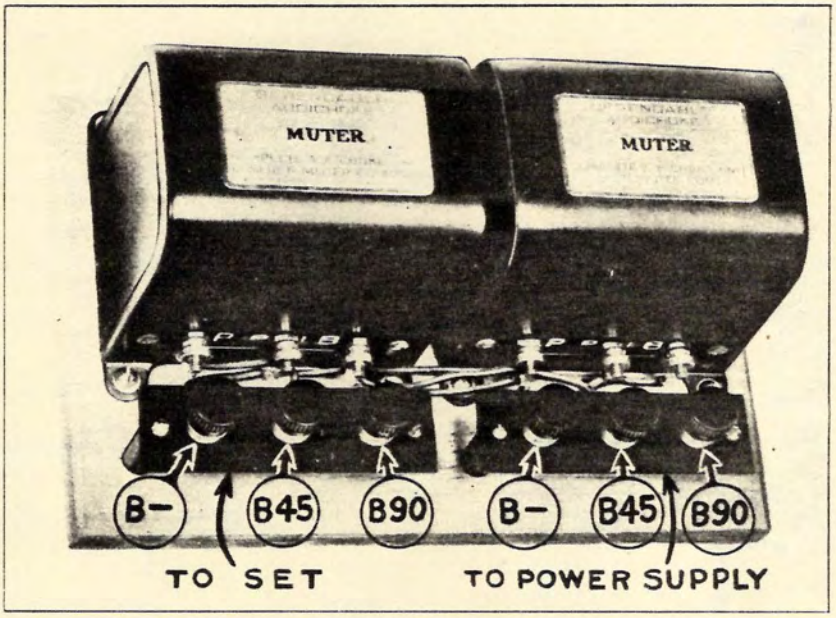
MULTIPLE AUDIO AMPLIFIER, 1928; Sht. 3

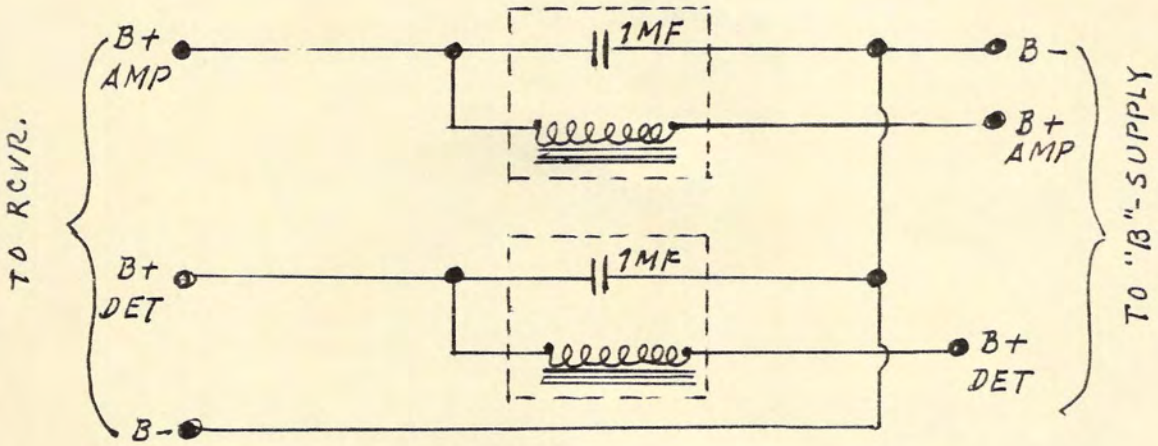


SAMSON "PAM" unit contains power xfrmr & the two chokes.

POWER SUPPLY

MUTER B-ELIMINATOR STABILIZER, 1928

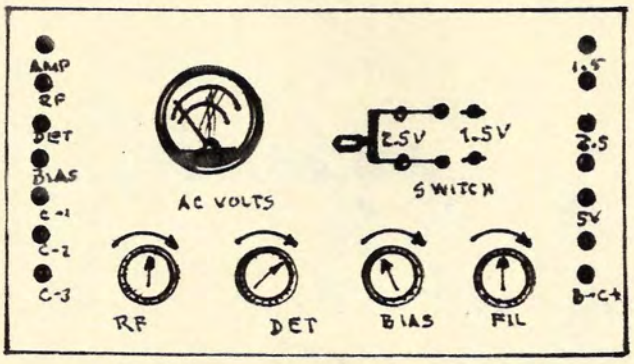


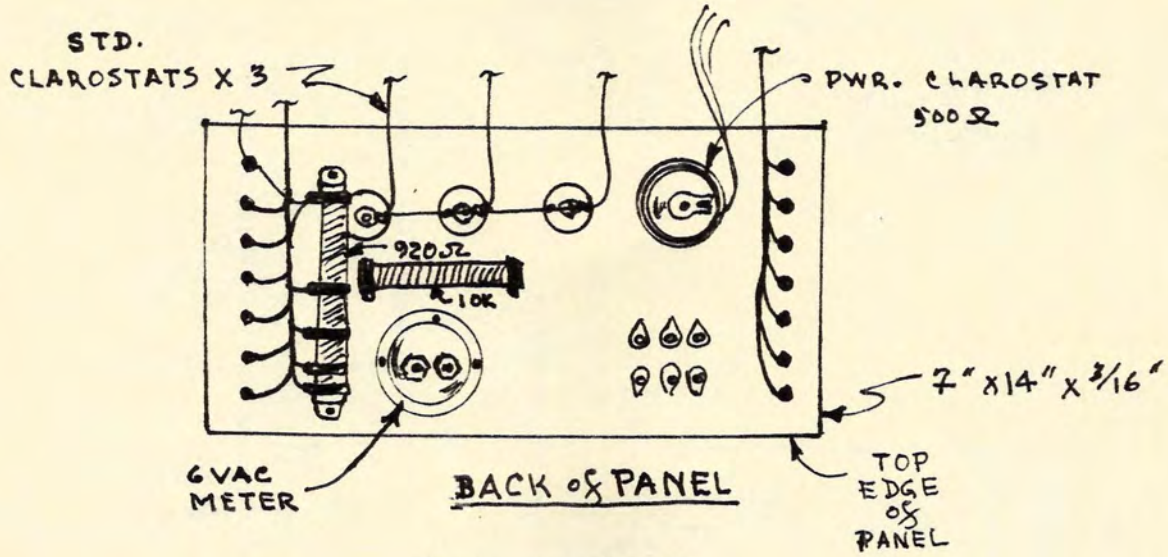


MUTER "Audiochokes" = 100H, 445Ω.

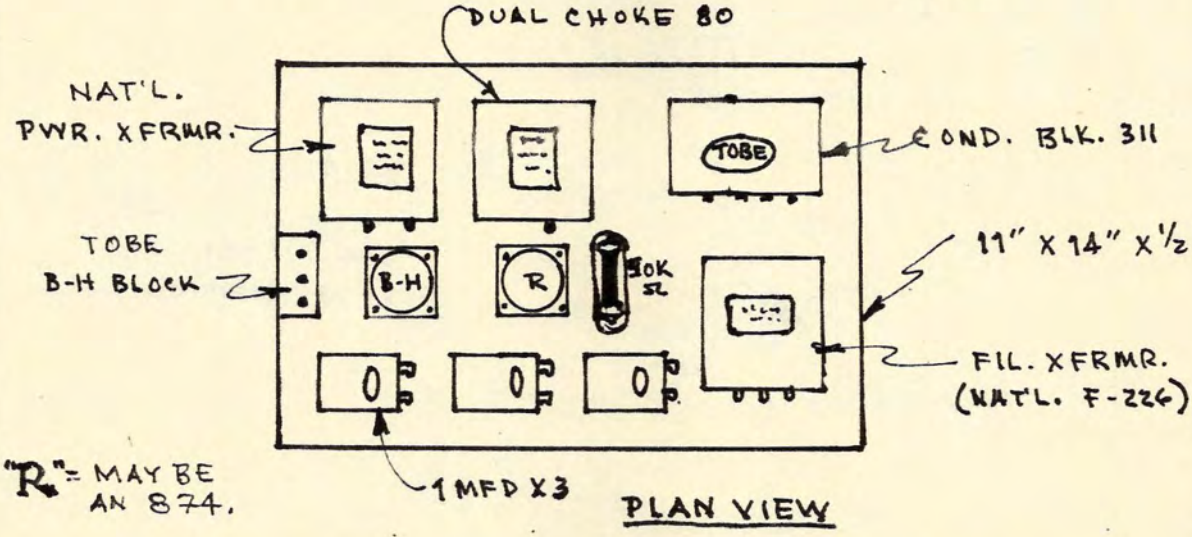
(RE 5·28)

NATIONAL POWER SUPPLY, 1928
(Sht. 1)



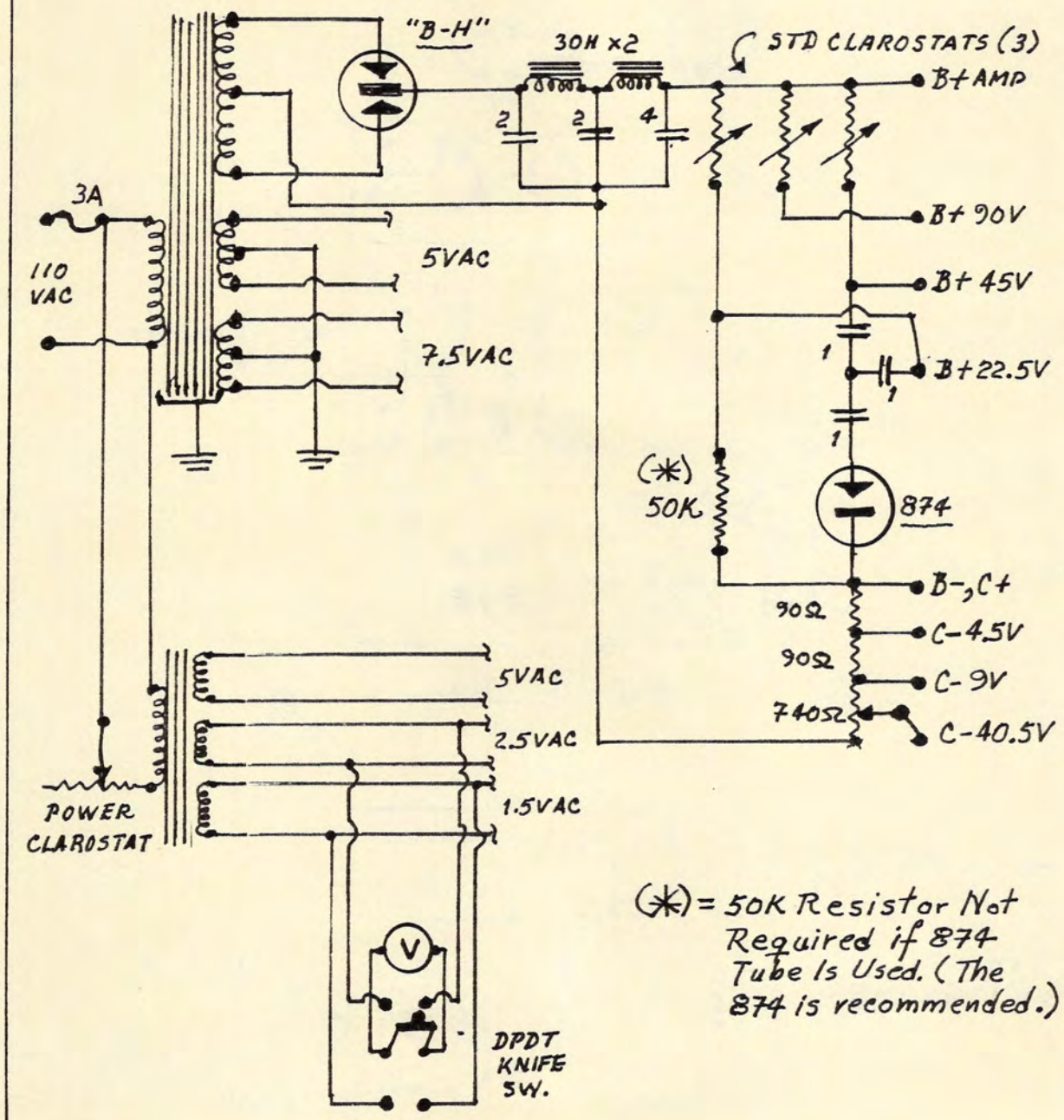


BACK OF PANEL



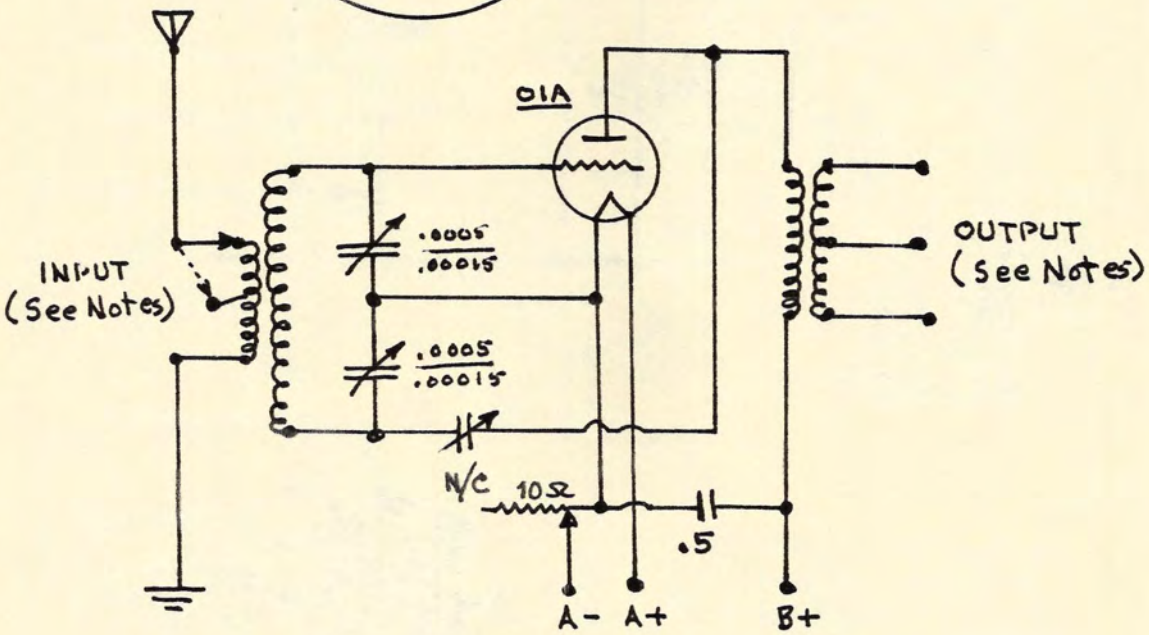
PLAN VIEW

NATIONAL POWER SUPPLY, 1928; Sht. 2



(*) = 50K Resistor Not Required if 874 Tube Is Used. (The 874 is recommended.)

"PENETROLA" PRE-AMPLIFIER, 1926



NOTES:

1. N/C = balancing condenser.

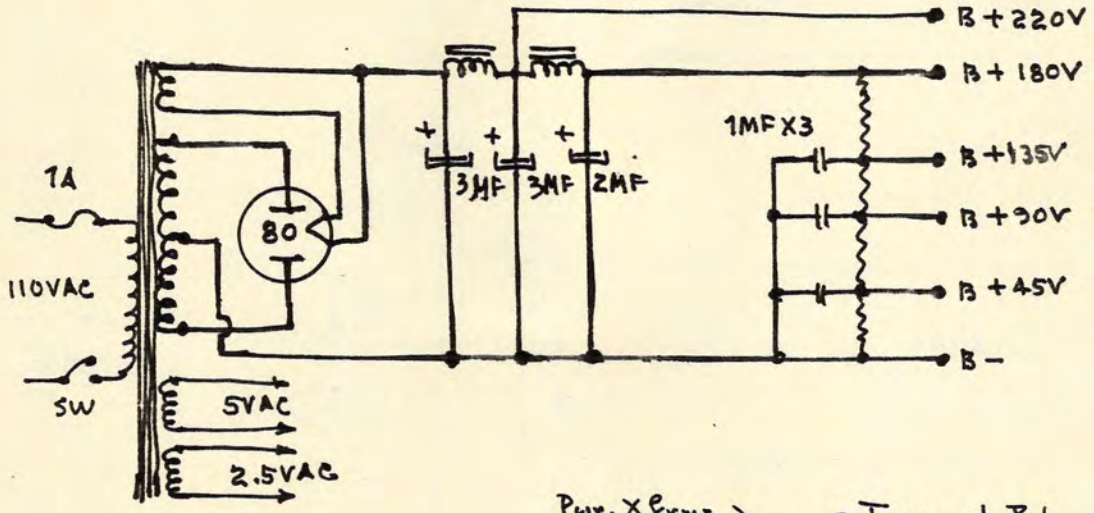
2. INPUT and OUTPUT coils may be vario-couplers, such as the oscillator coils used with early super-hets; REMLER and Silver-Marshall, for example.

3. Unit must be completely shielded.

4. The .5 MFD by-pass is absolutely mandatory to obviate oscillation.

(See Seperate PILOT MONOGRAPH.)

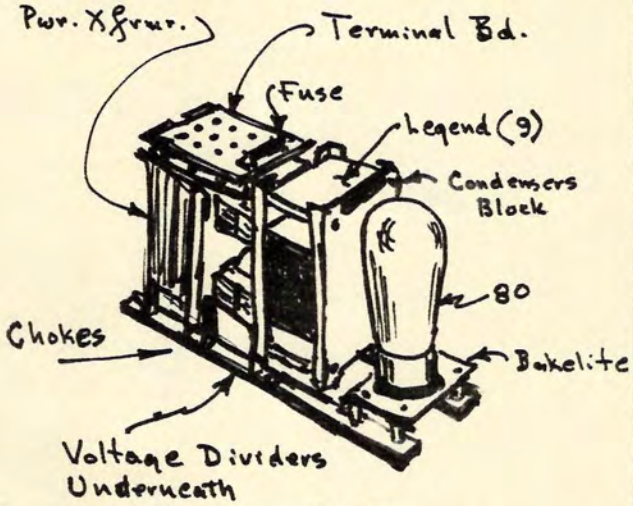
PILOT AC THREE POWER SUPPLY, 1929



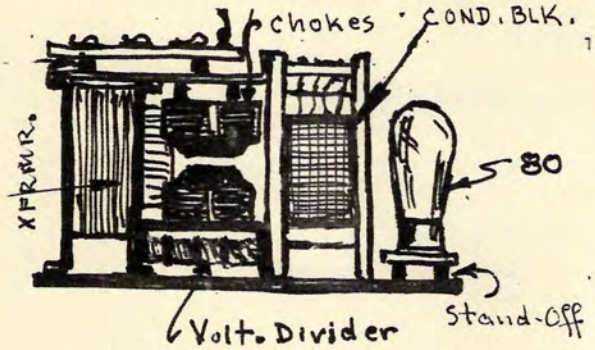
NOTE:

Original PILOT power transformer had 3 AC filament wirings; not shown in the above.

Legend atop unit shows pictogram of condensers and their connexions.



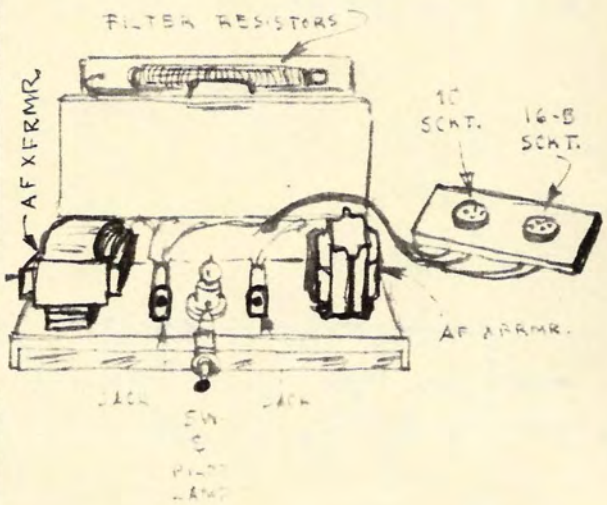
K-112
(Cover Removed)
(See K-113 Schematic)

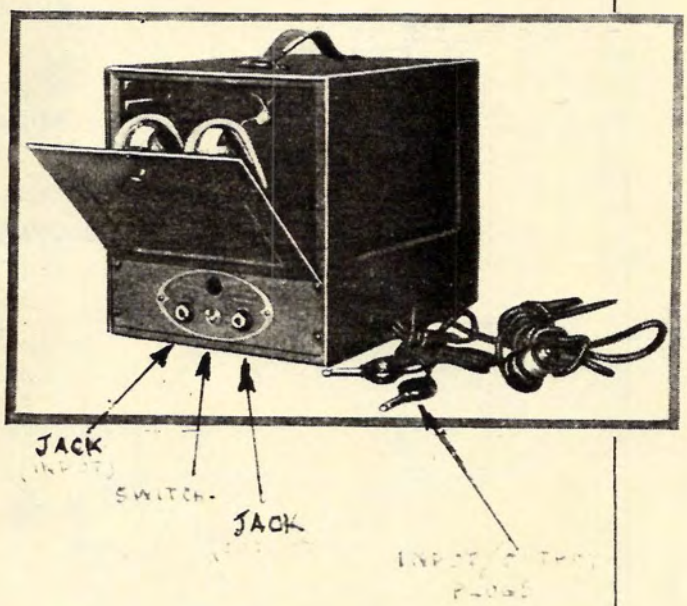


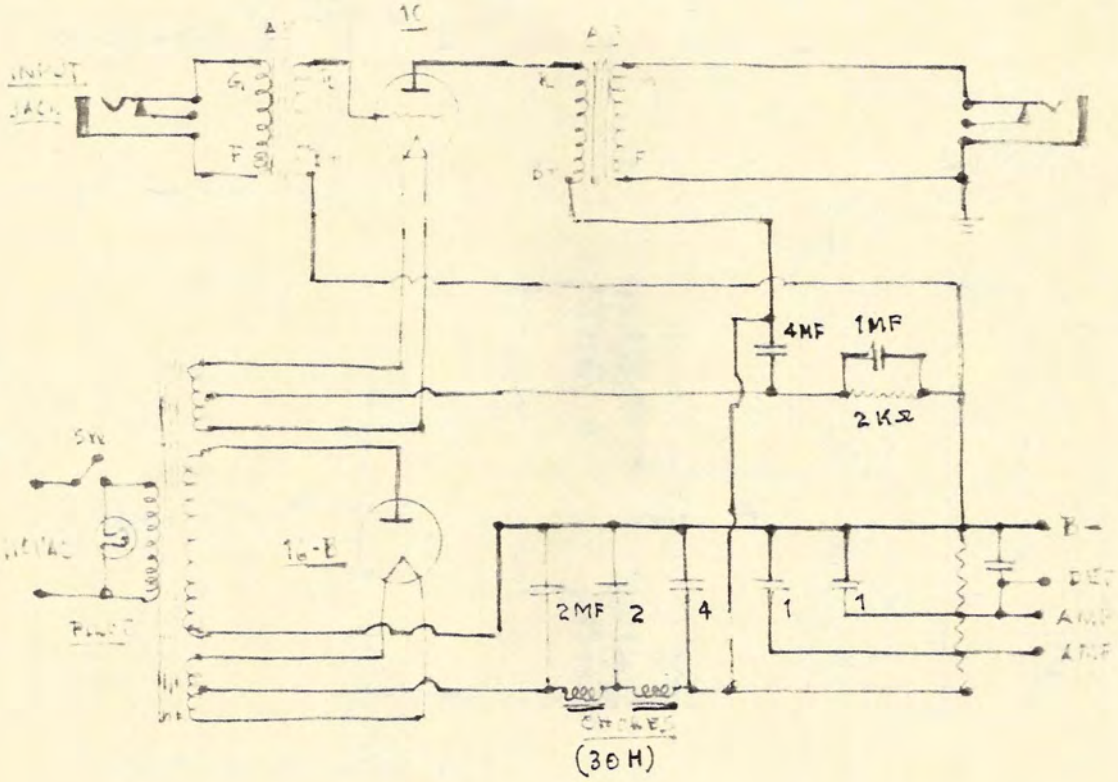
ELEVATION

(Refer to the seperate PILOT Monograph for full coverage of PILOT units from 1926 through 1931.)

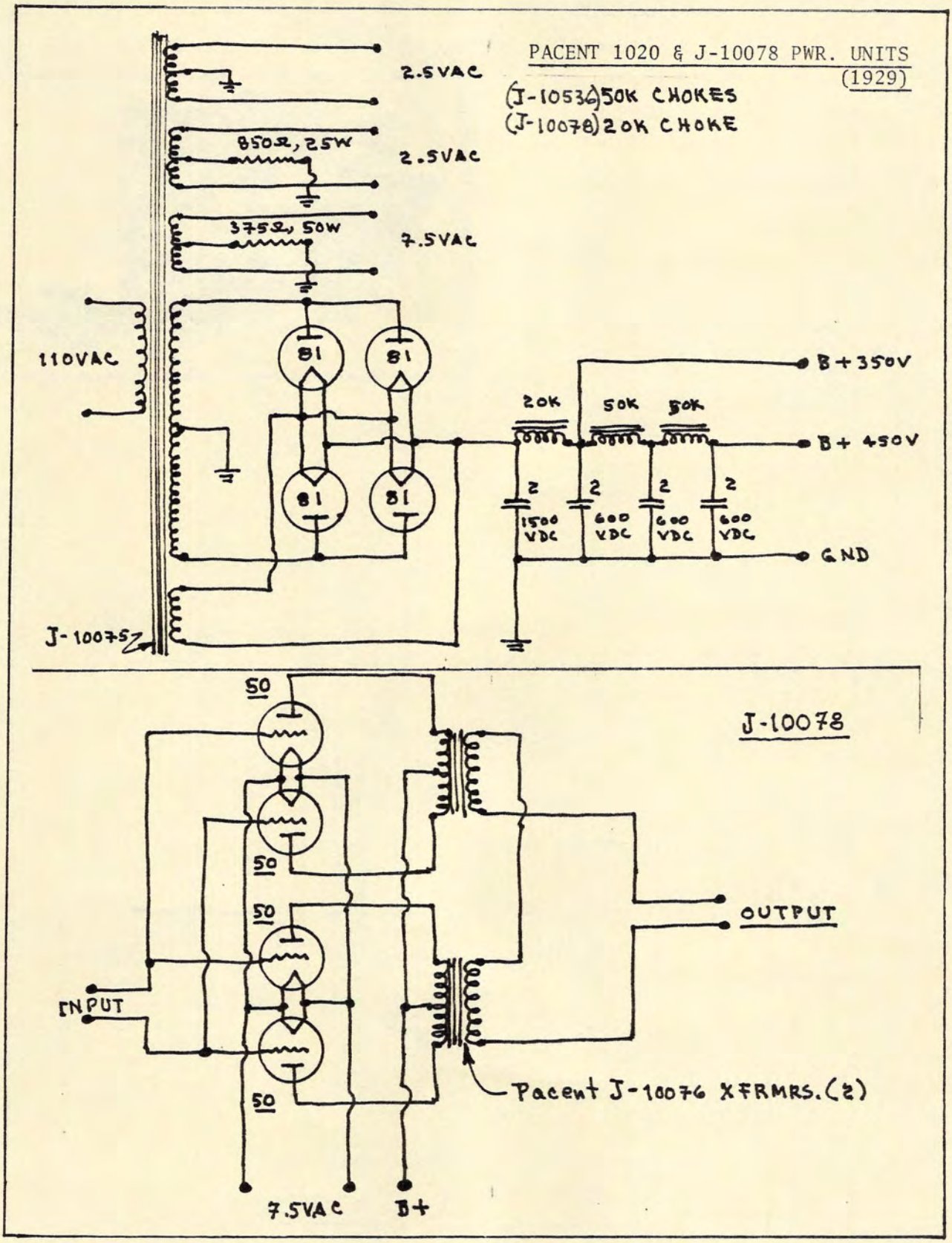
PACENT "POWERFORMER" B-ELIMINATOR; 1926

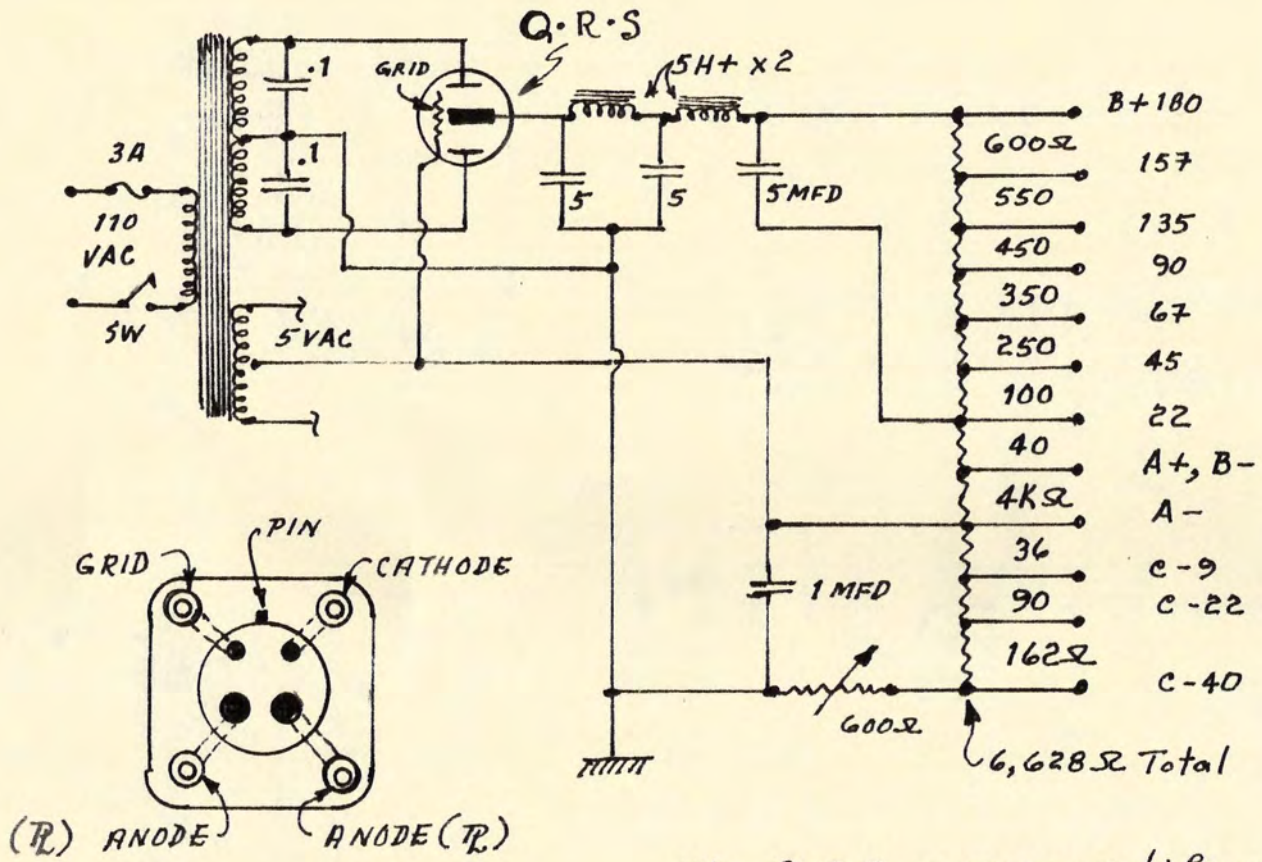






Tube-door-shelf has porcelain sockets.
Base-plate was metal-on-wood.

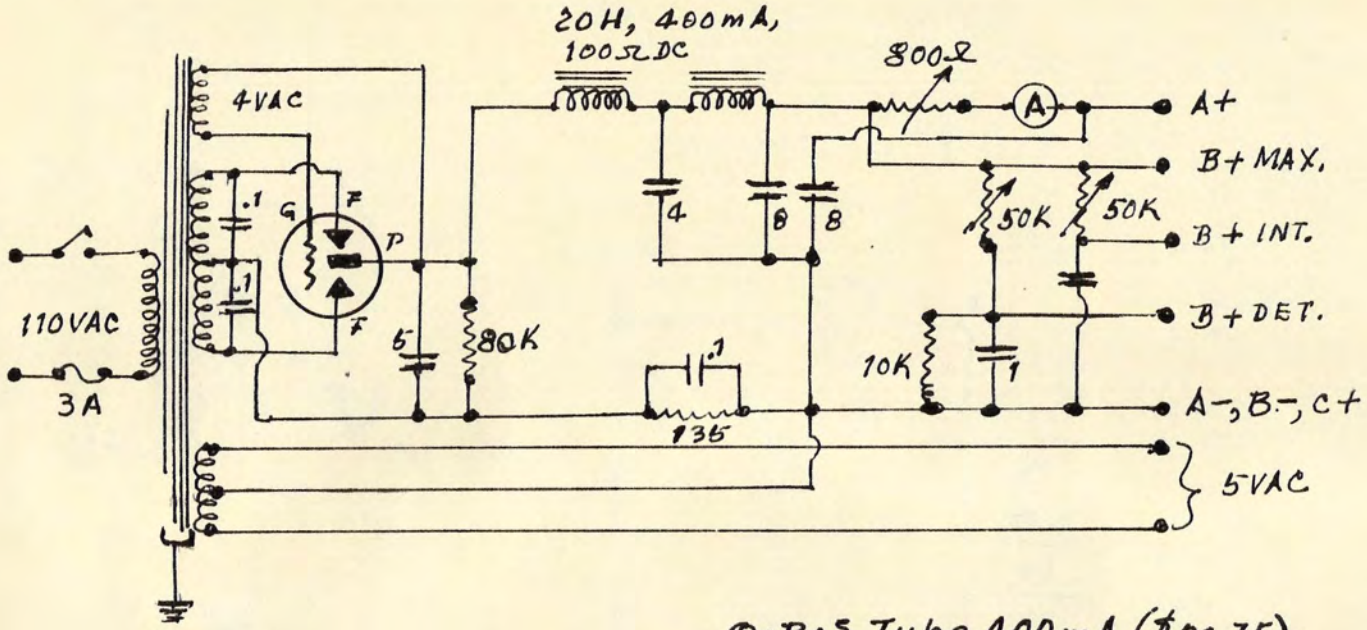

PACENT 1020 & J-10078 PWR. UNITS
(1929)
(J-10536) 50K CHOKES
(J-10078) 20K CHOKE
2.5VAC
850Ω, 25W
2.5VAC
375Ω, 50W
7.5VAC
110VAC
81
81
81
81
B+350V
20K
50K
50K
B+ 450V
2
2
2
2
1500 VDC
600 VDC
600 VDC
600 VDC
GND
J-10075
J-10078
50
50
50
50
OUTPUT
INPUT
Pacent J-10076 XFRMRS. (2)
7.5VAC
B+

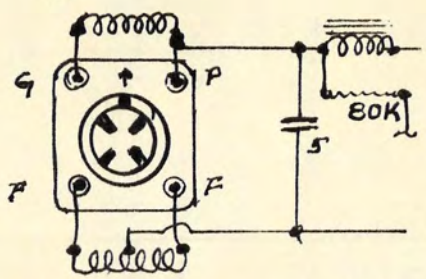


SOCKET PLAN VIEW

The Q·R·S gaseous rectifier was essentially the Raytheon B·H w/ an added grid element. There was not much difference between them in performance.

A Q-R-S "ORPHAN" POWER SUPPLY, '26

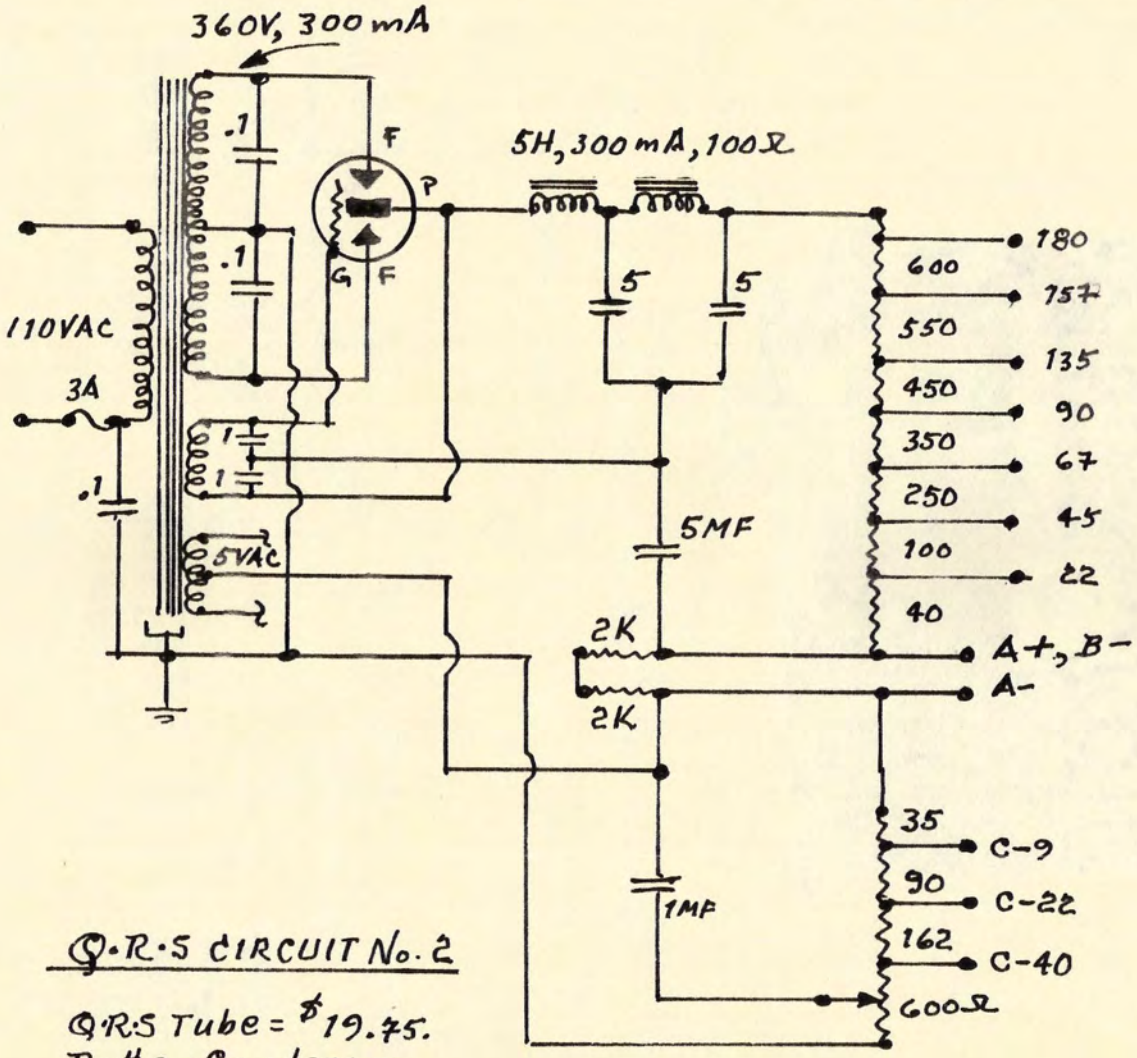




TUBE CONNEXIONS

Q·R·S Tube 400mA ($21.75).
Xfrmr. SEC = 375V.
Potter Cond. Blocks Originally.

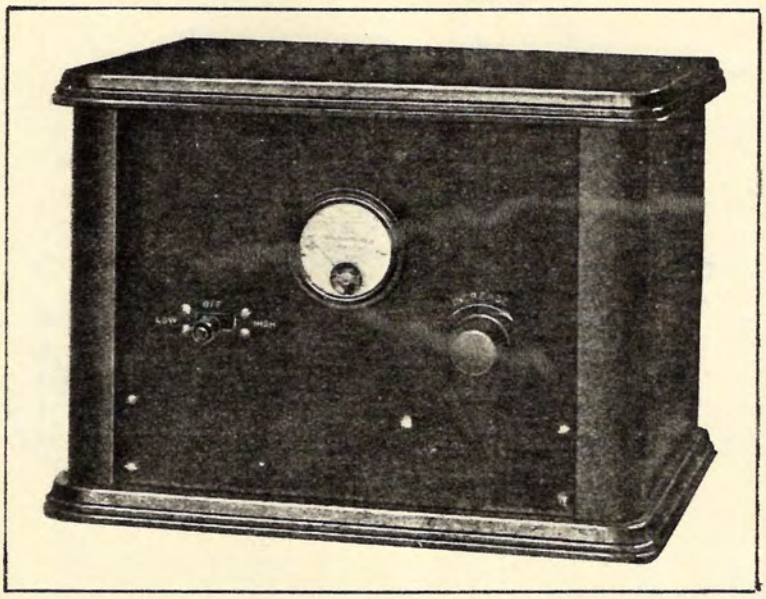
Q·R·S CIRCUIT No. 1



Q·R·S CIRCUIT No. 2

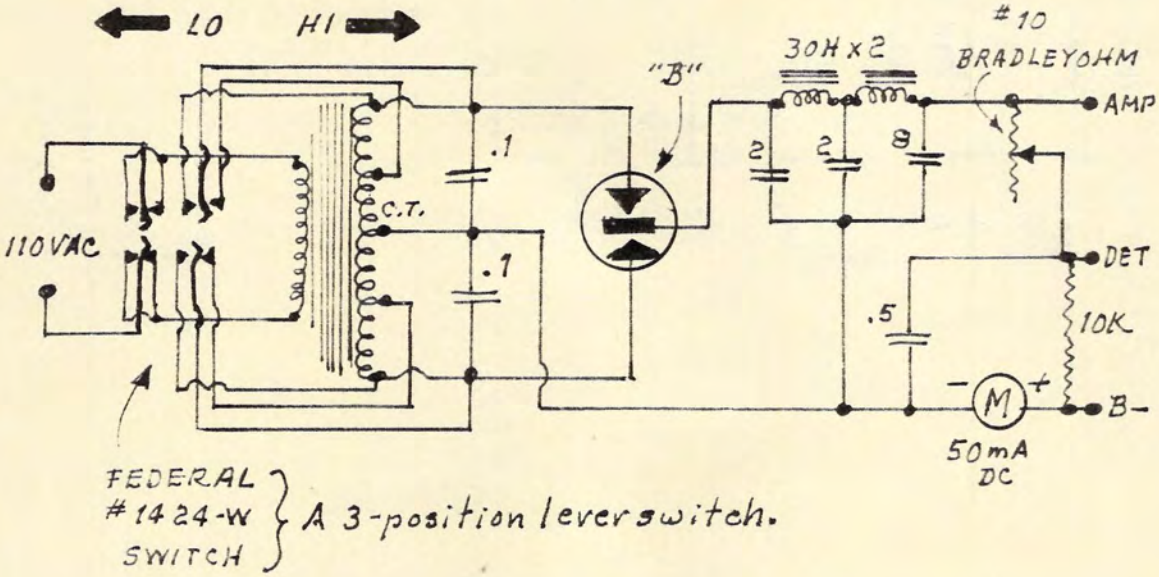
Q·R·S Tube = $19.75.
Potter Condenser
Block used Originally.

(Sht. 1) RAYTHEON's FIRST COMMERCIAL ELIMINATOR, '26

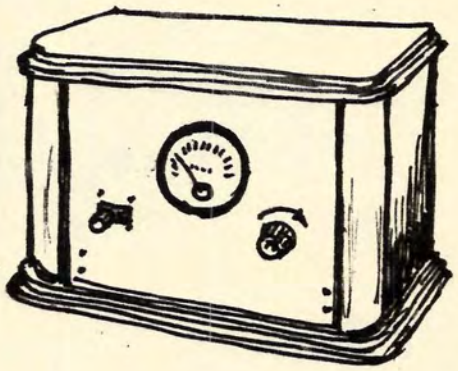


Designed by F.S. Dellenbaugh, Jr.; M.I.T.; 1926

(Refer to Sht. 2 for additional details.)

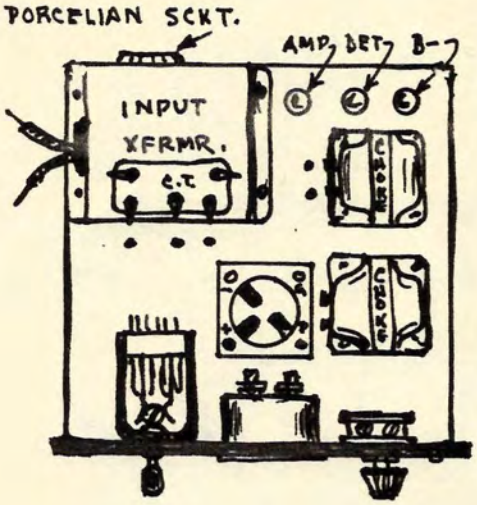


(Sht. 2) RAYTHEON's FIRST COMMERCIAL ELIMINATOR, 1926

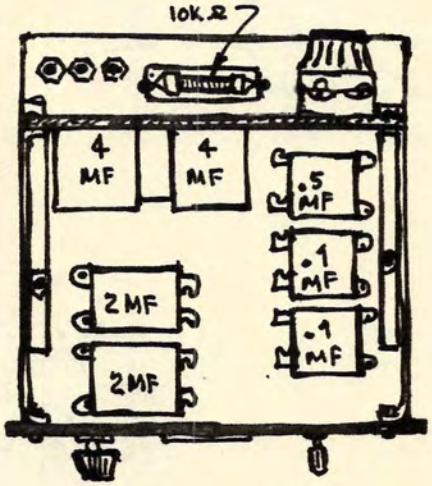


NOTES:

1. Meter shows current delivered to plates.
2. Xfrmr., choke, condenser frames grounded to B-.
3. Fixed resistor carried 15 mA max.
4. Meter was Hoyt 0-50 mA.
5. Insert soldering lugs under items in (2), and connect via buss-bar.
6. Higher "C" voltages may be used with this unit.
7. Lever switch was Federal #1424-W.
8. Sub-panel brackets were Benjamin #8629.

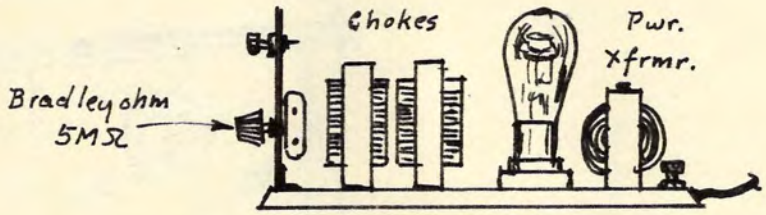


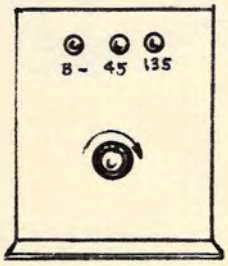
ORIGINAL SUB-PANEL LAYOUT



BOTTOM VIEW OF SUB-PANEL

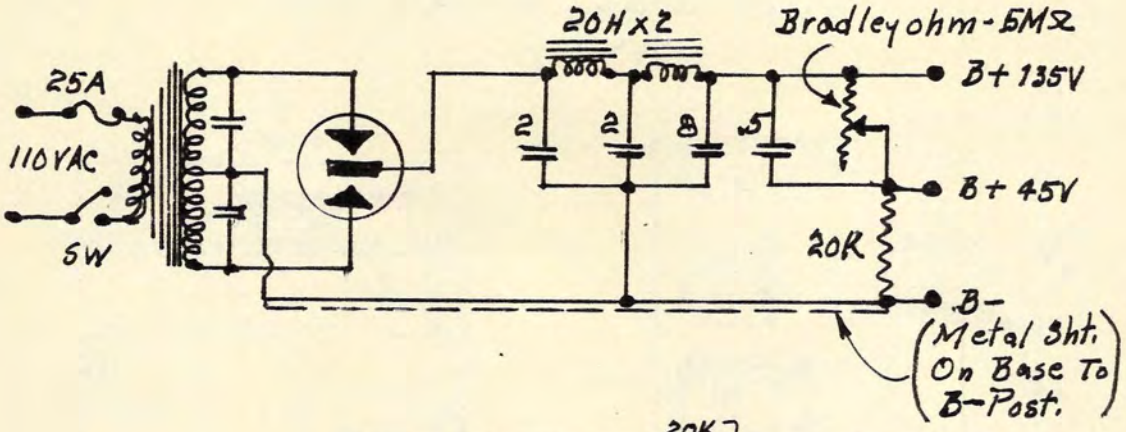
FIRST CIRCUIT DESIGNED AROUND RAYTHEON's NEW RECTIFIER,'25

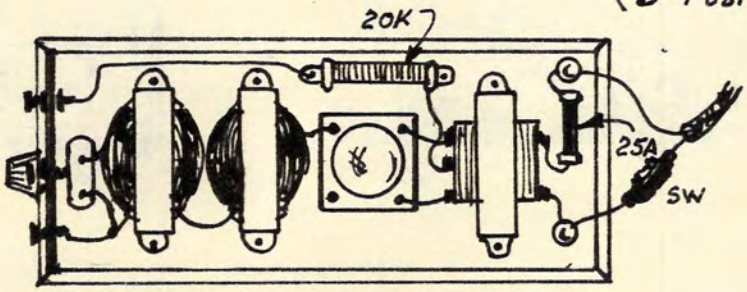




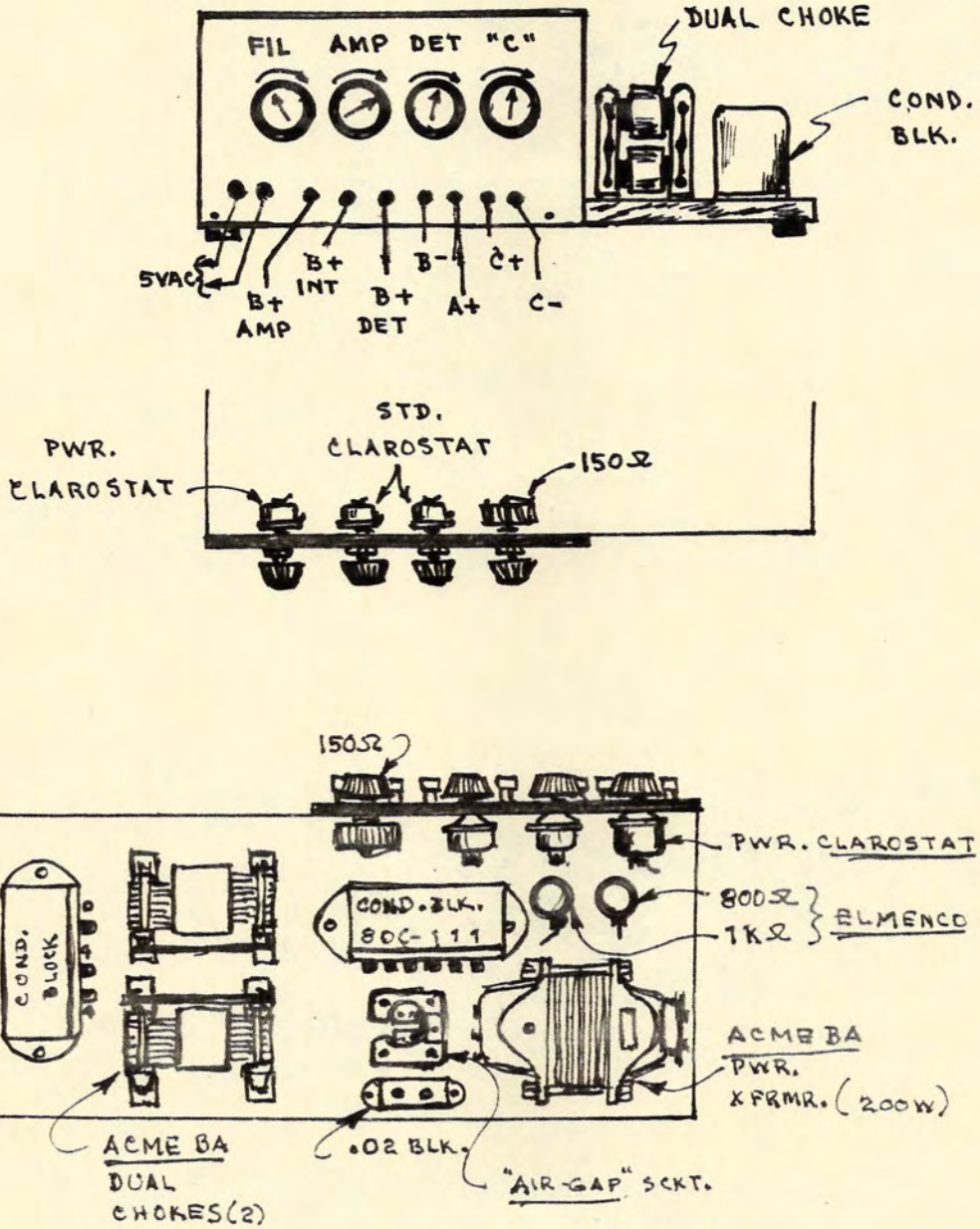
NOTES

1. Panel = 6" x 7".
2. Baseboard = 6" x 12".
3. #14 Rubber-Covered Wire.
4. 25A Fuse.
5. SHORE Xfrmr. Used Originally.
6. Baseboard Covered w/ Al. Al. Sheet.
7. Max. Output = 60mA.; Best Operation Was @ 26 mA.

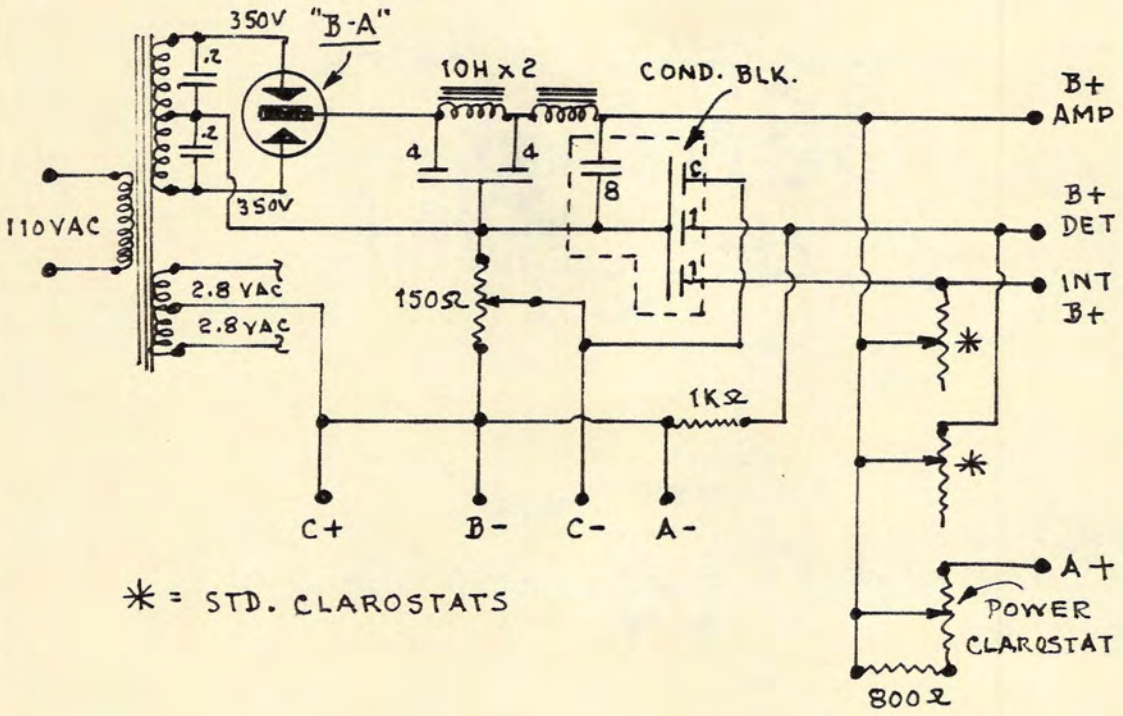




RAYTHEON "B-A" ELIMINATOR, 1929; Sht. 1



RAYTHEON "B-A" ELIMINATOR. 1927; Sht.2



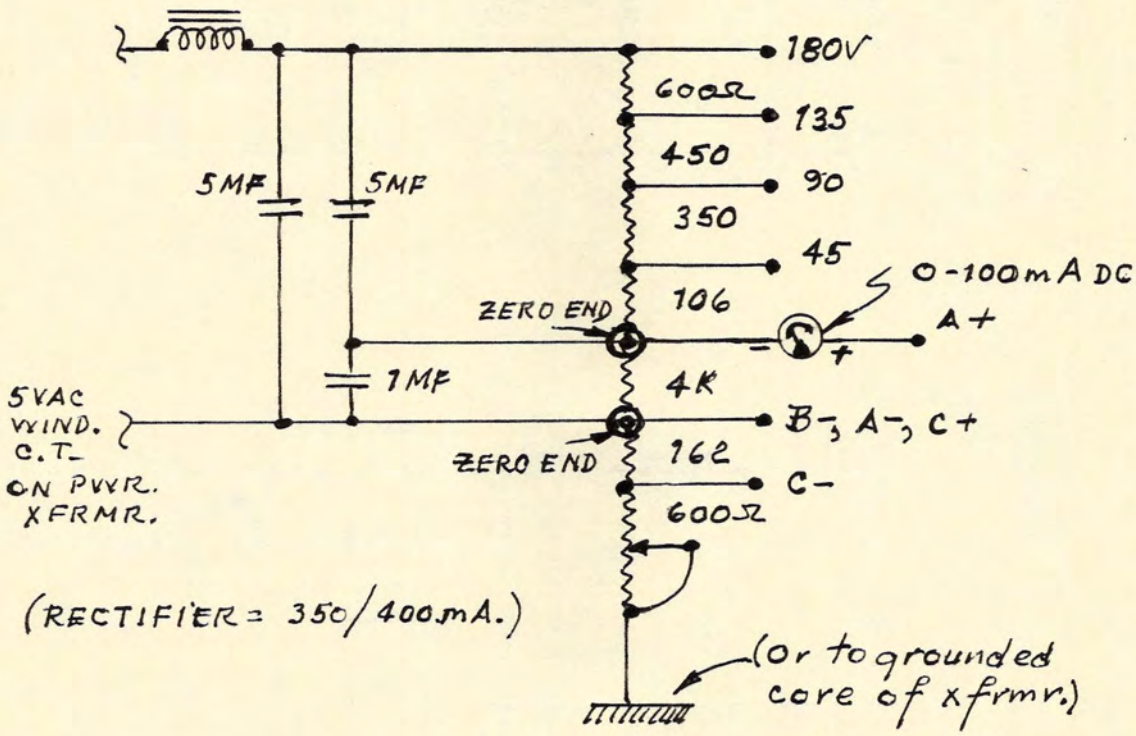
GENERAL NOTES: "B-A" tube will pass 350 mA. Filaments must be in series.
Condenser blocks were TOBE A-B-C, #1 & 2 buffer filter.
Gross weight = 40 pounds.
ACME power xfrmr. and chokes used originally: BA-200W/10H.
Panel = 7" x 11" x 3/16".
Baseboard = 10" x 20" x ½".
(10) Binding posts, X-L type.
(2) Standard Clarostats; (1) Power Clarostat.
800 and 1,000-ohm resistors mounted vertically.
150-ohm potentiometer.

CAUTION

If B-A tube is over-loaded, a tiny cherry-red spot will develop, which is an UNSAFE condition. The best load is around 280 mA; and no load less than 200 mA should be utilized.

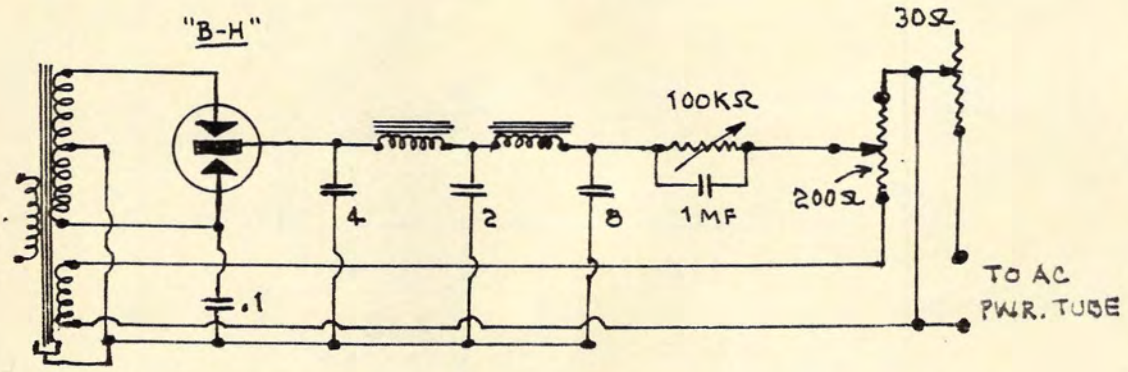
RAYTHEON "B-A" ELIMINATOR, 1927; Sht. 3

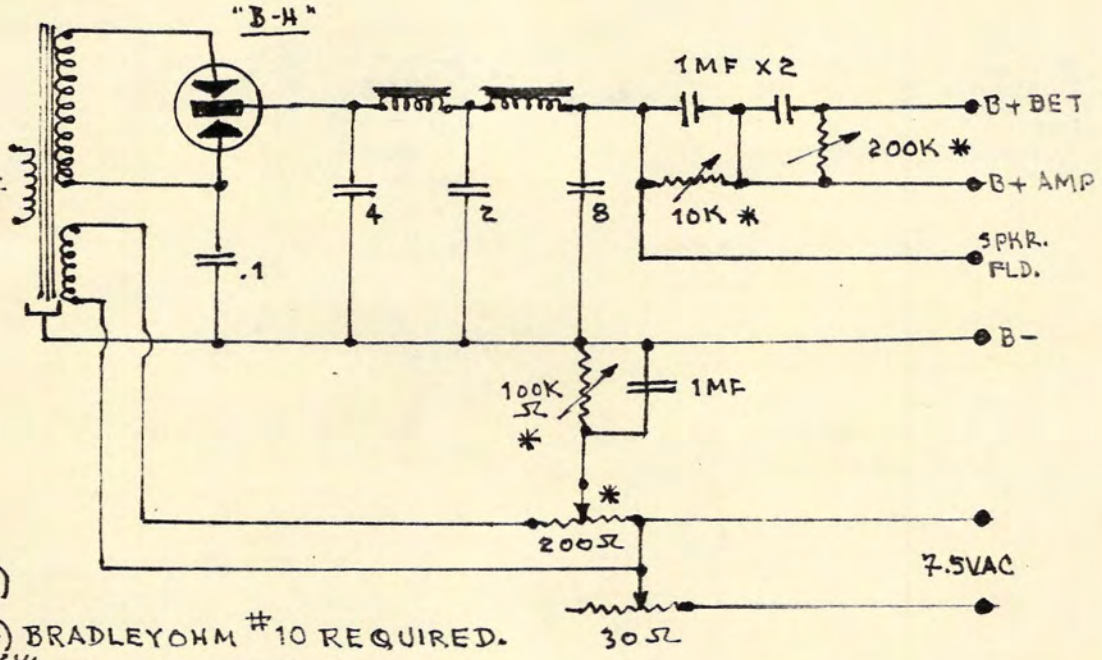
ALTERNATIVE VOLTAGE DIVIDER NETWORK:



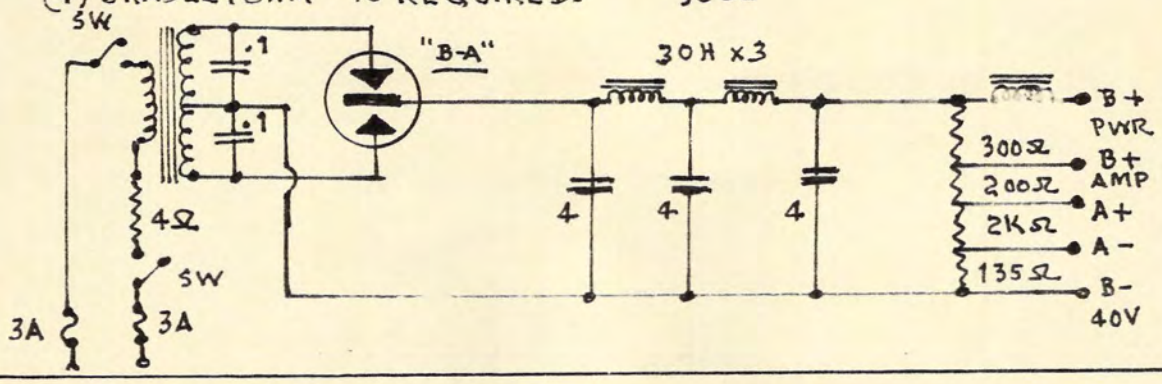
NOTE: Filaments must be in series.

RAYTHEON "B" ELIMINATORS, 1926

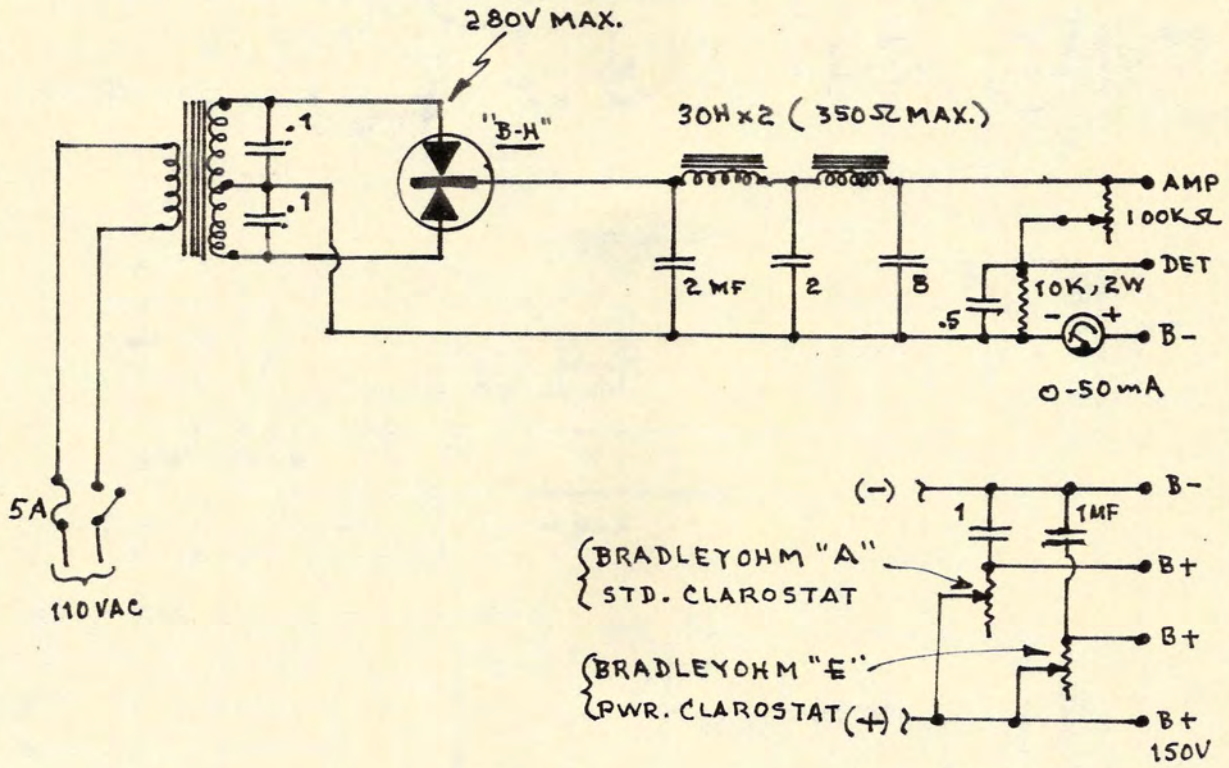




(*)
(4) BRADLEYOHM #10 REQUIRED.



RAYTHEON B-ELIMINATORS, 1926

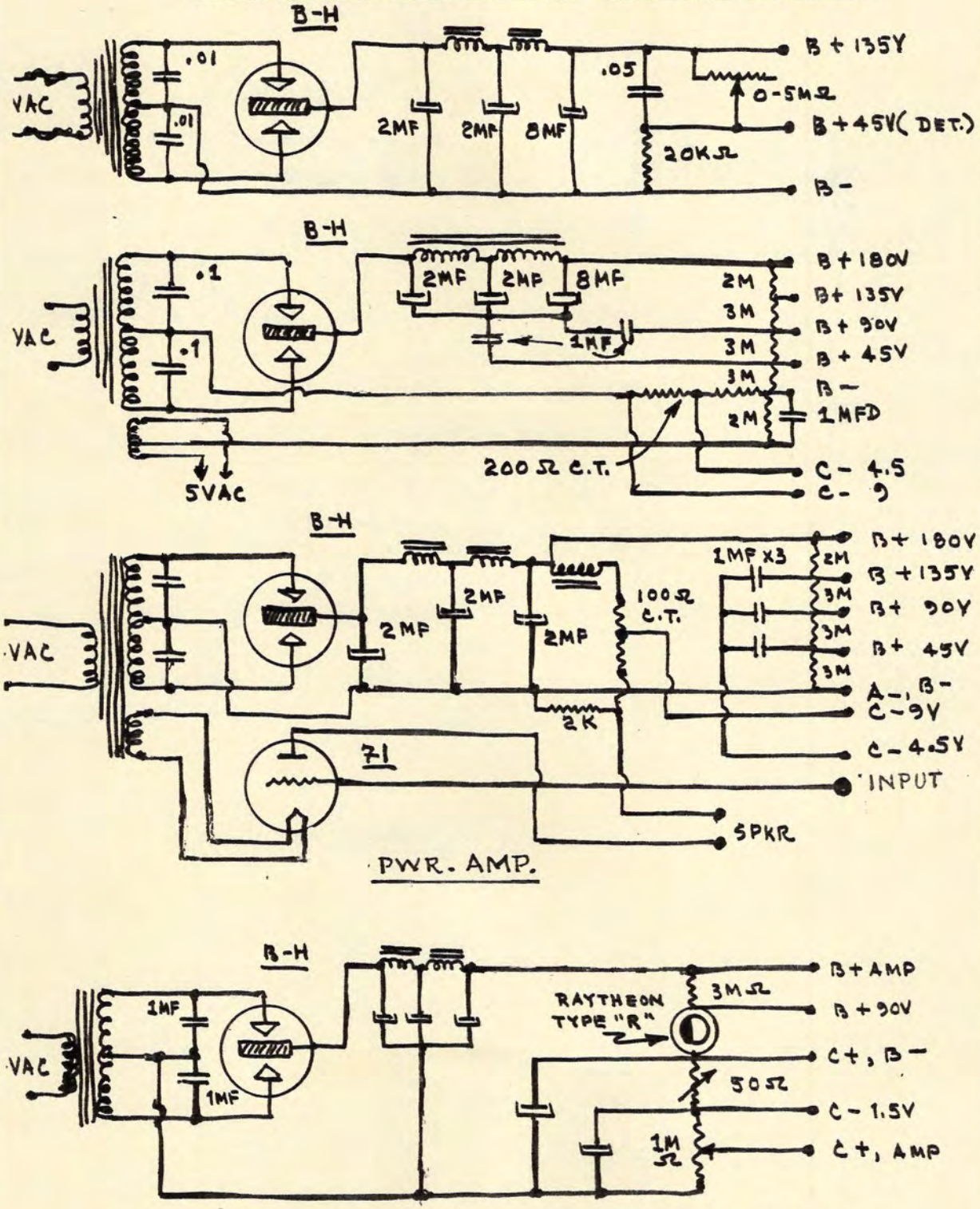


ALTERNATE CONFIGURATION

TYPICAL PLATE CURRENTS IN mA

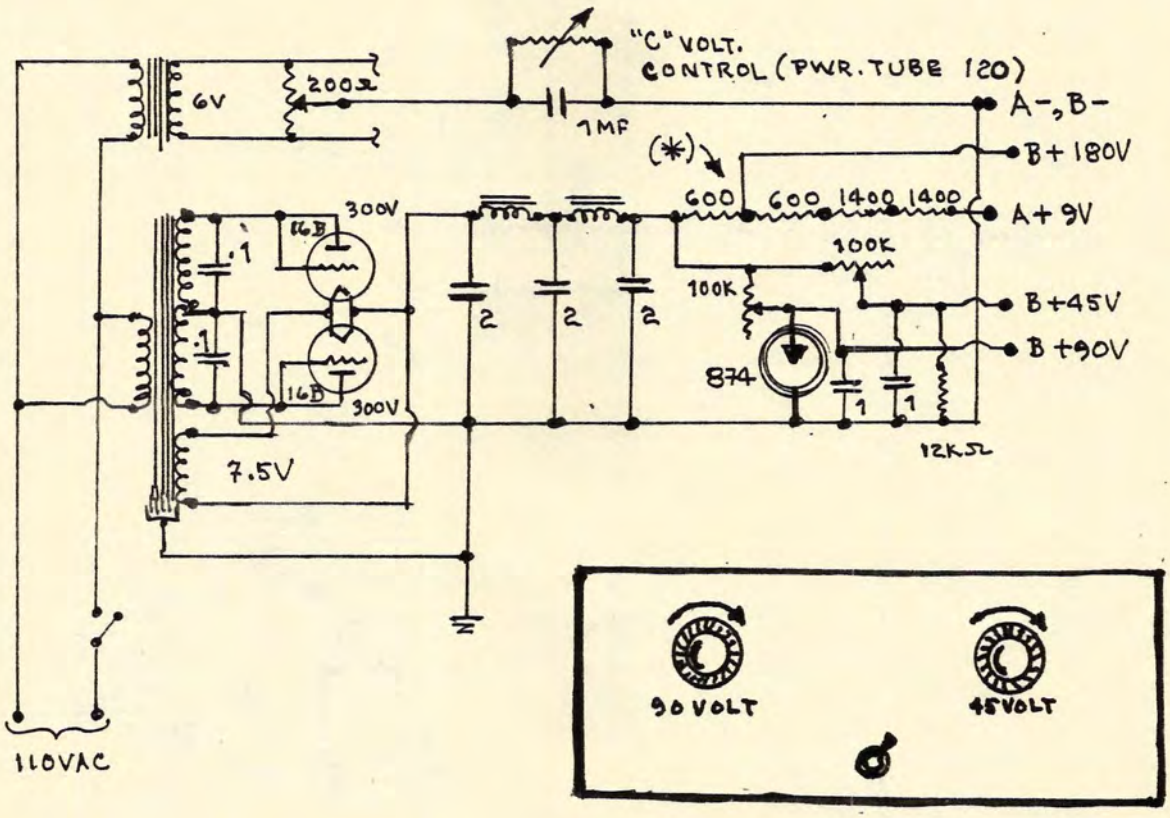
01A	=	2.5
12A	=	5
71A	=	10
22	=	1.7
24A	=	4
26	=	2.9
27	=	3
38	=	1.2

BATTERY ELIMINATORS USING RAYTHEON GASEOUS RECTIFIERS



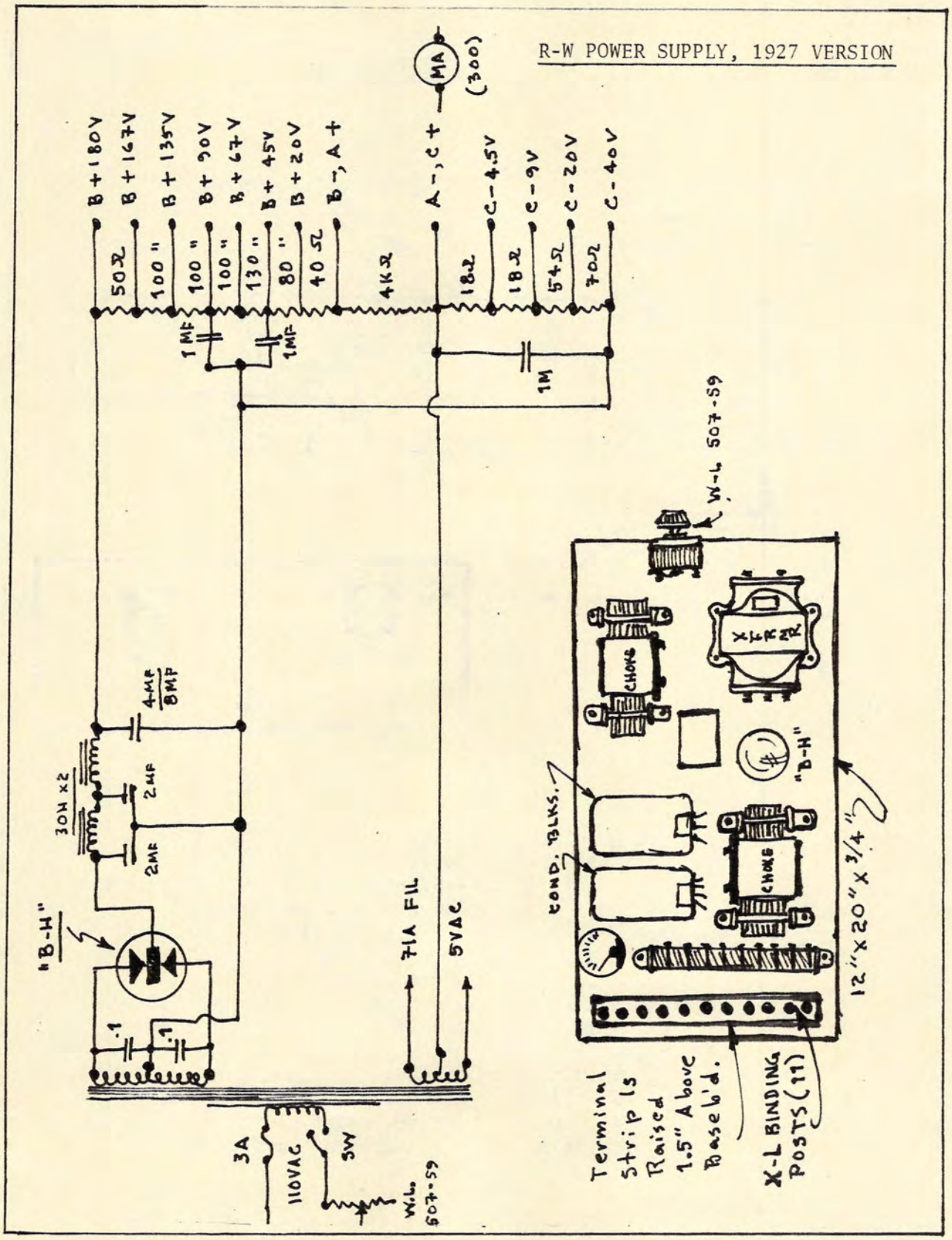
(This circuit originally used for Silver-Marshall's Unit #330.)

"RADIO's" A-B-C BATTERY ELIMINATOR
(FOR 99 TUBES) (1926)

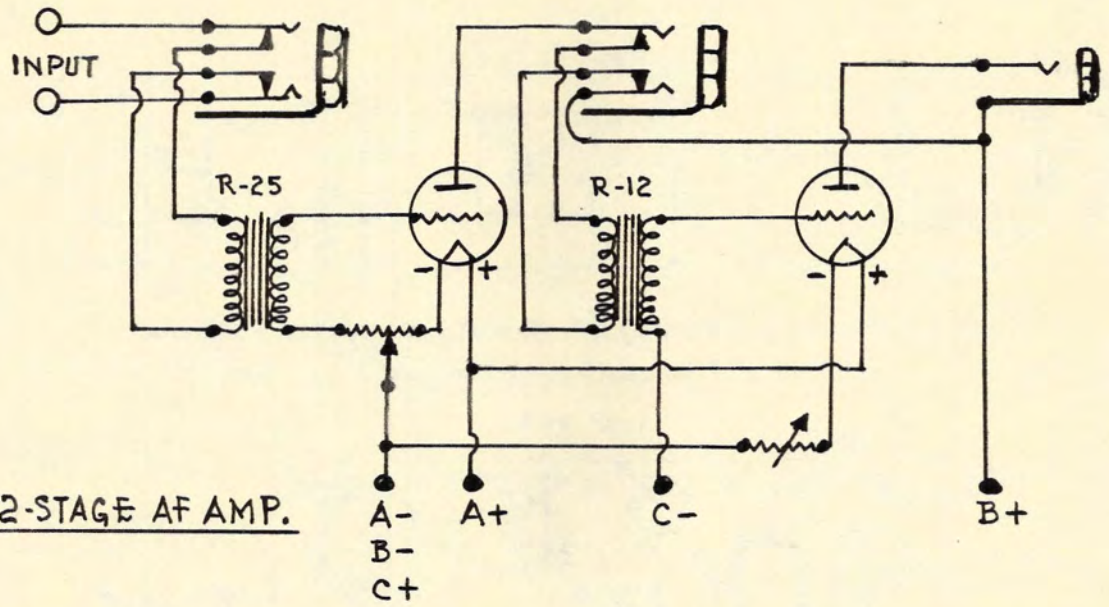


NOTES:

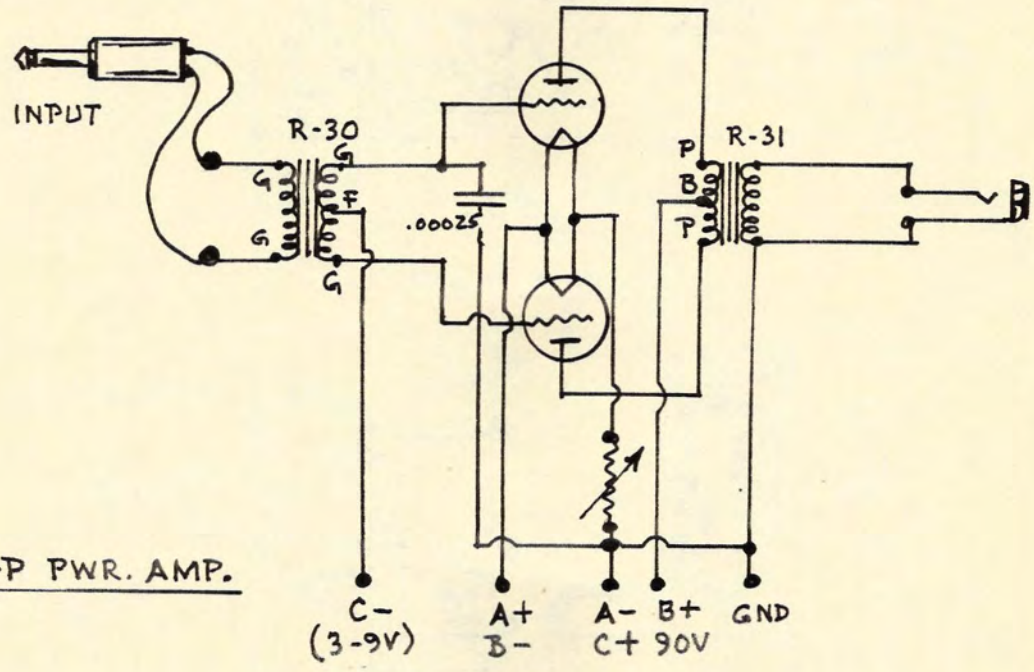
1. 6V transformer was originally a 10W bell-ringing job.
2. Safety factor for the 16-B tubes was 50%.
3. Biasing pot. for any 5V tube, known as a power tube, (200-ohms) is shown on the 6V xfrmr. winding.
4. Current drain on the 874 is normally 10 mA; total current drain 105 mA; total output = 225V.
5. Maximum rectifier load = 120 mA.
6. (*) = original resistors were (2) 25W lamp-bulbs and (2) 10W bulbs. The resistor string is simpler and more depedable.
7. Panel = 7" x 18" x 3/16".
8. This is a slightly curious eliminator, and as you study it, questions arise, chiefly: "Why?" However, the circuit has been constructed, and it works.


R-W POWER SUPPLY, 1927 VERSION
B+180V
B+167V
B+135V
B+90V
B+67V
B+45V
B+20V
B-, A+
A-, C+
C-4.5V
C-9V
C-20V
C-40V
MA
(300)
50Ω
100"
100"
100"
130"
80"
40Ω
4KΩ
18Ω
18Ω
54Ω
70Ω
1MF
1MF
1M
W-L 507-59
CHOKE
CHOKE
"B-H"
COND. BLKS.
12"x20"x3/4"
Terminal Strip is Raised 1.5" Above Baseb'd.
X-L BINDING POSTS (11)
4MF
8MF
30H x2
2MF
2MF
"B-H"
.1
.1
7½A FIL
5VAC
3A
110VAC
5W
W.L. 507-59

RAULAND "ALL-AMERICAN" AF AMPLIFIERS
(1927)

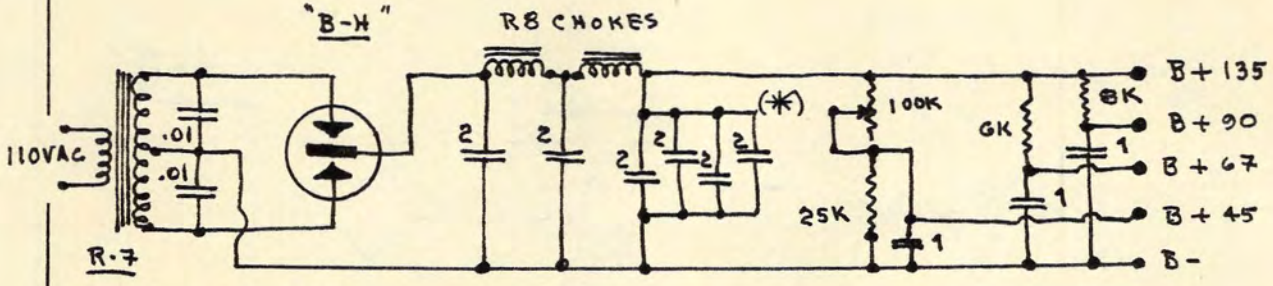


2-STAGE AF AMP.

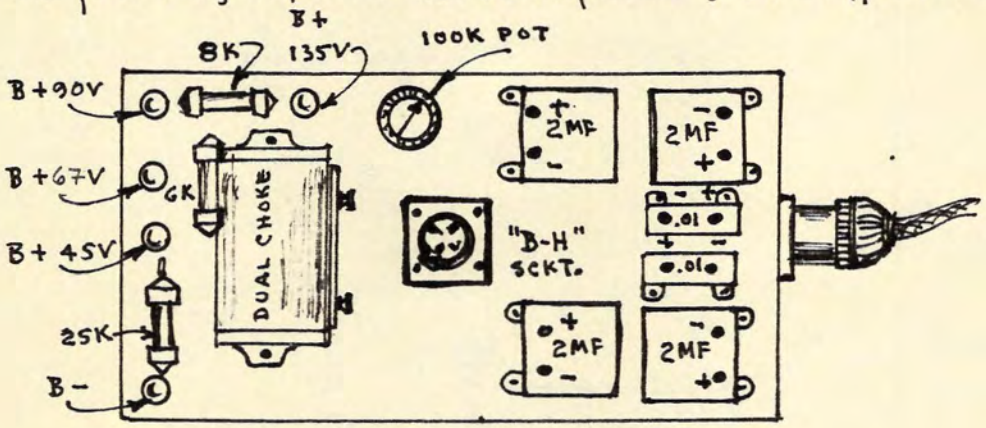


P-P PWR. AMP.

RAULAND "ALL-AMERICAN" B-ELIMINATOR,'27
(Sht. 1)

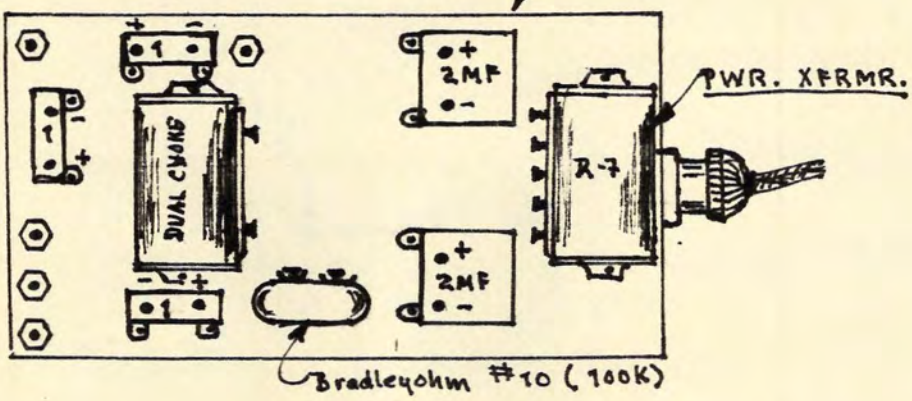


"P" NOS. (TERMINAL POSTS) BY RAULAND NOT SHOWN.
(*) = The four 2mf capacitors can be replaced w/ an 8mf electrolytic.

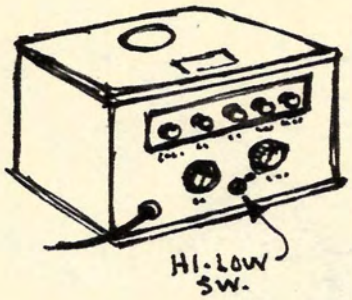


TOP VIEW

BOTTOM VIEW



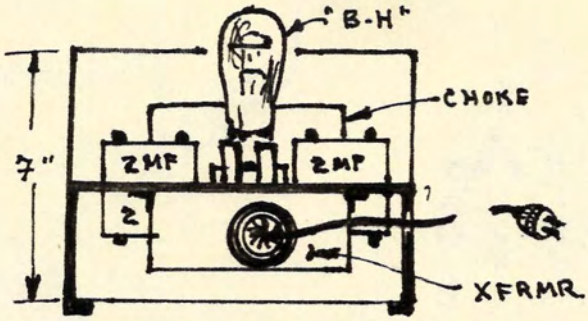
RAULAND "ALL-AMERICAN" B-ELIMINATOR: 1927
(Sht. 2)



FACTORY CONFIGURATION

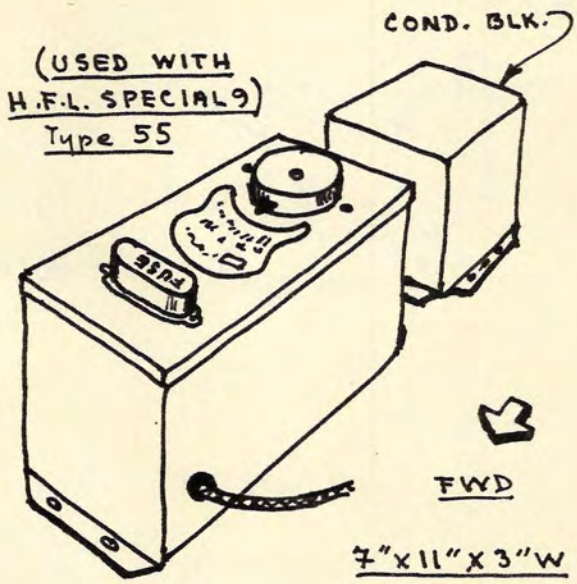
Metal Cabinet = 7" x 10" x 9"

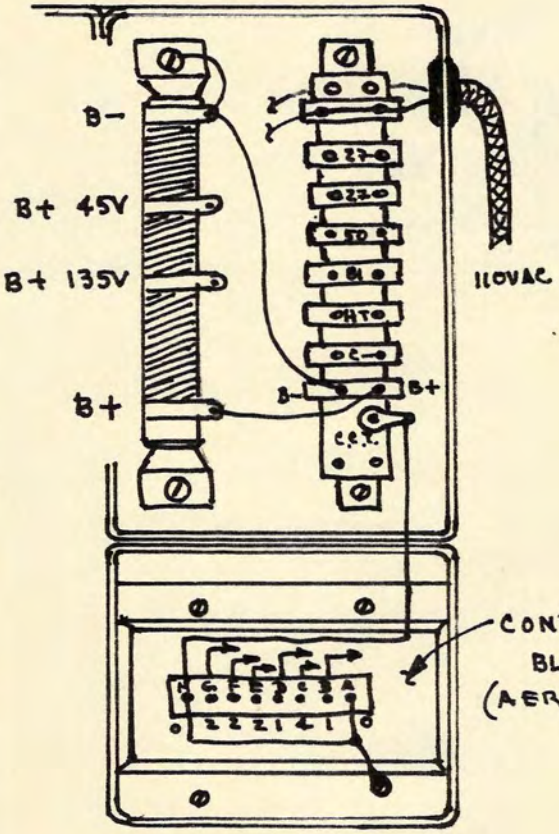
Sold originally for $37.50,
east of the Rockies.



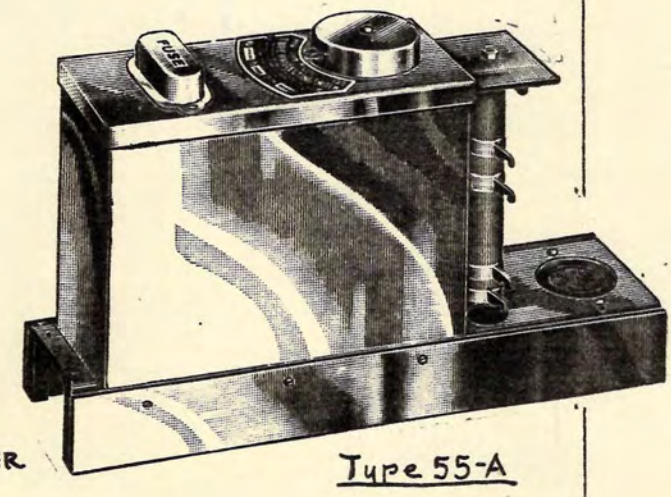
OPEN END VIEW

RADIART TYPES 55 & 55-A POWER UNITS, '29
(Sht. 1)





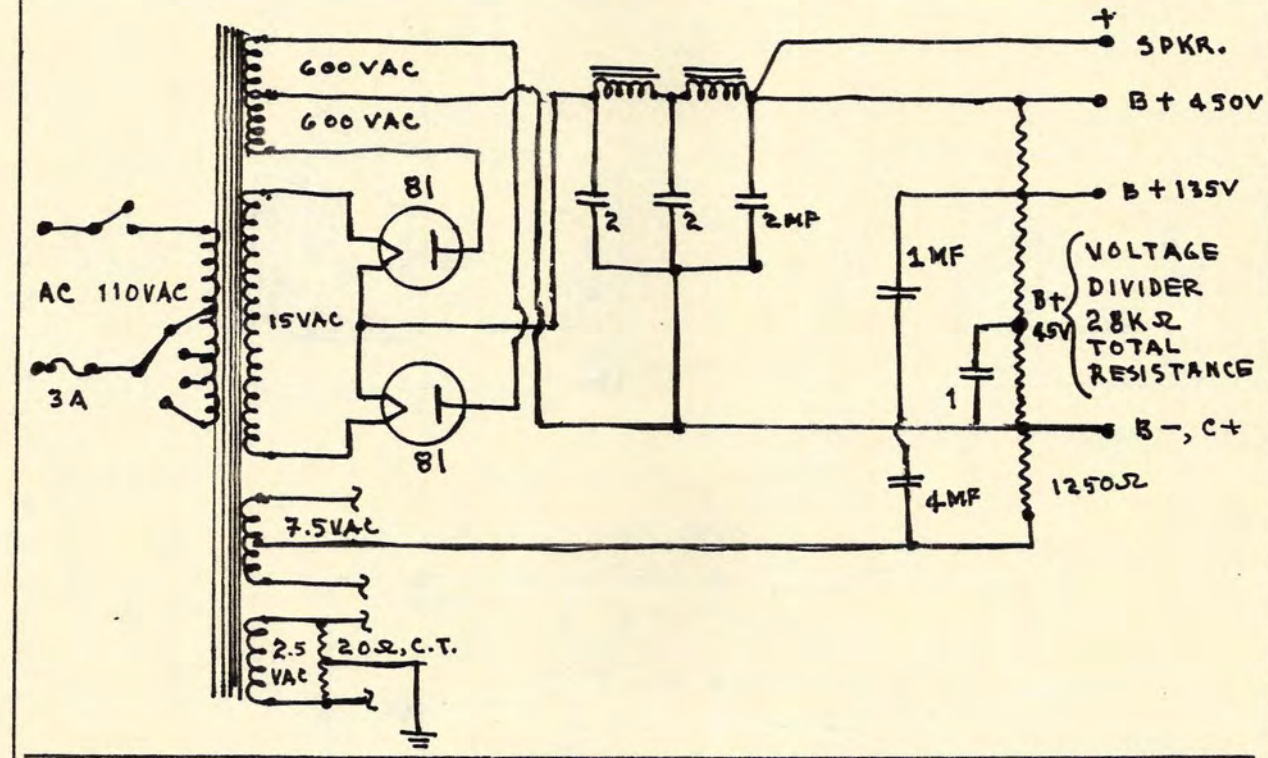
BOTTOM VIEW

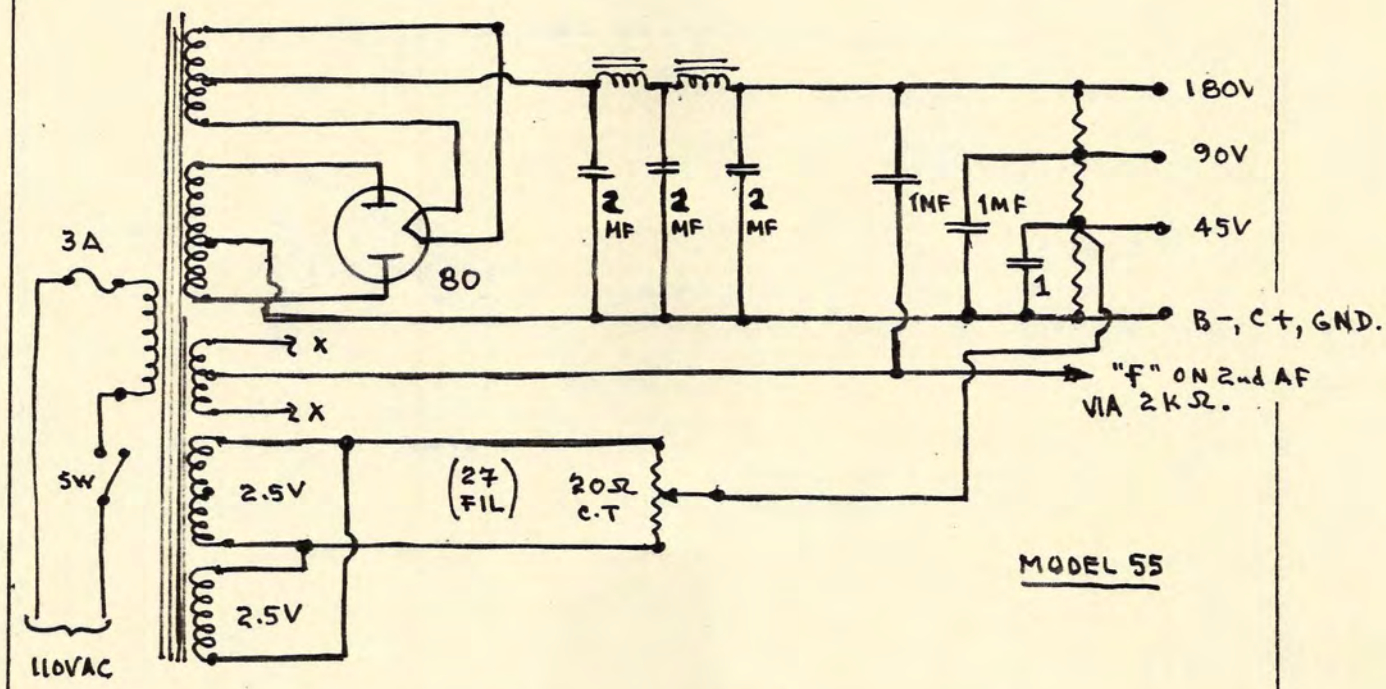


Type 55-A

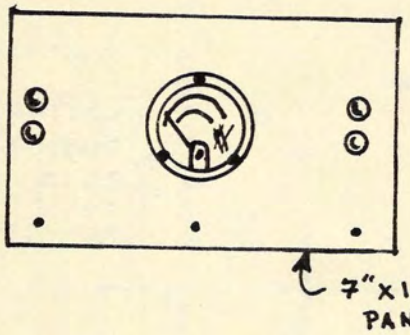
(CB Vol.3,#3)

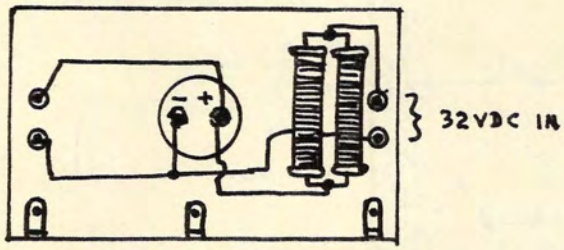
RADIART TYPES 55 & 55A POWER UNITS, '29
(Sht. 2)

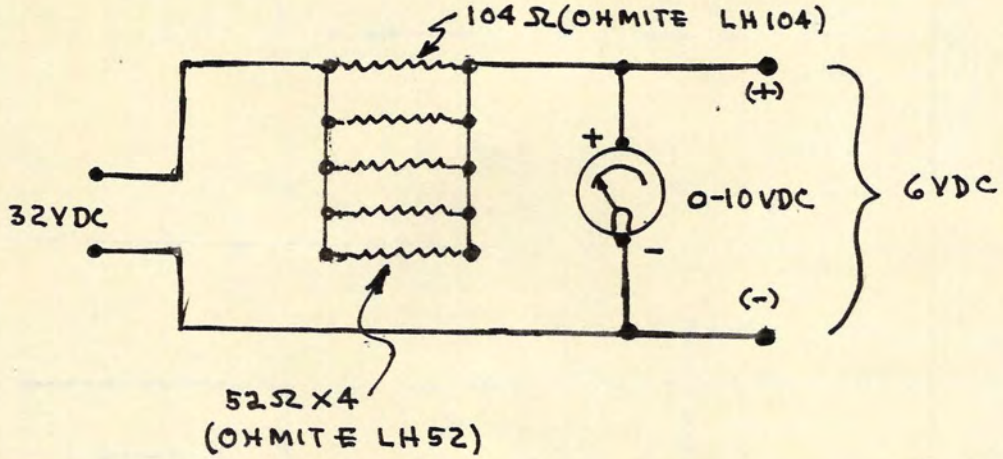




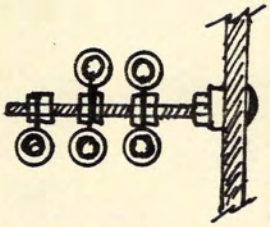
6V "A"-SUPPLY FROM A 32VDC SOURCE: '28







MAX. CURRENT = 2.25A
WILL HANDLE 9 TUBES of .25A, EACH.
WILL HANDLE 58.5 W.



METHOD OF
MNTNG. RESISTORS

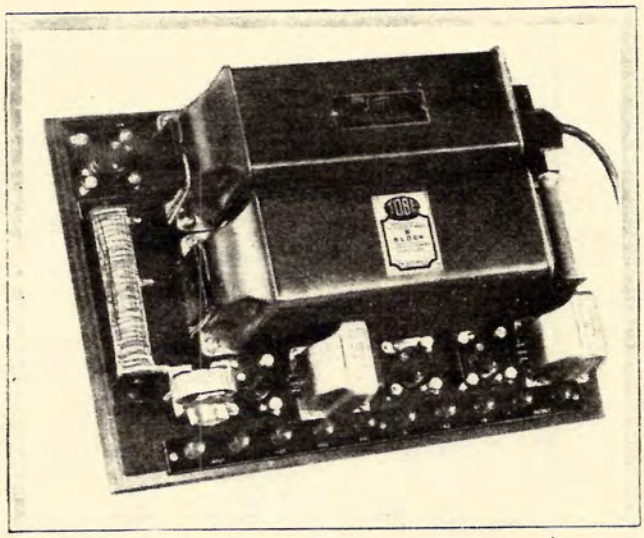
SAMSON P-ABC-3 POWER AMPLIFIER

1. SAMSON P-PAF XFRMRS. (2).
2. SAMSON PWR. XFRMR. #718.
3. TOBE 713 CONDENSER BLOCK.
4. Hardwick-Field 470Ω Resistor.
5. Hardwick-Field 2850 Ω Resistor.
6. Frost #980 50K-Ω Variable Resist.

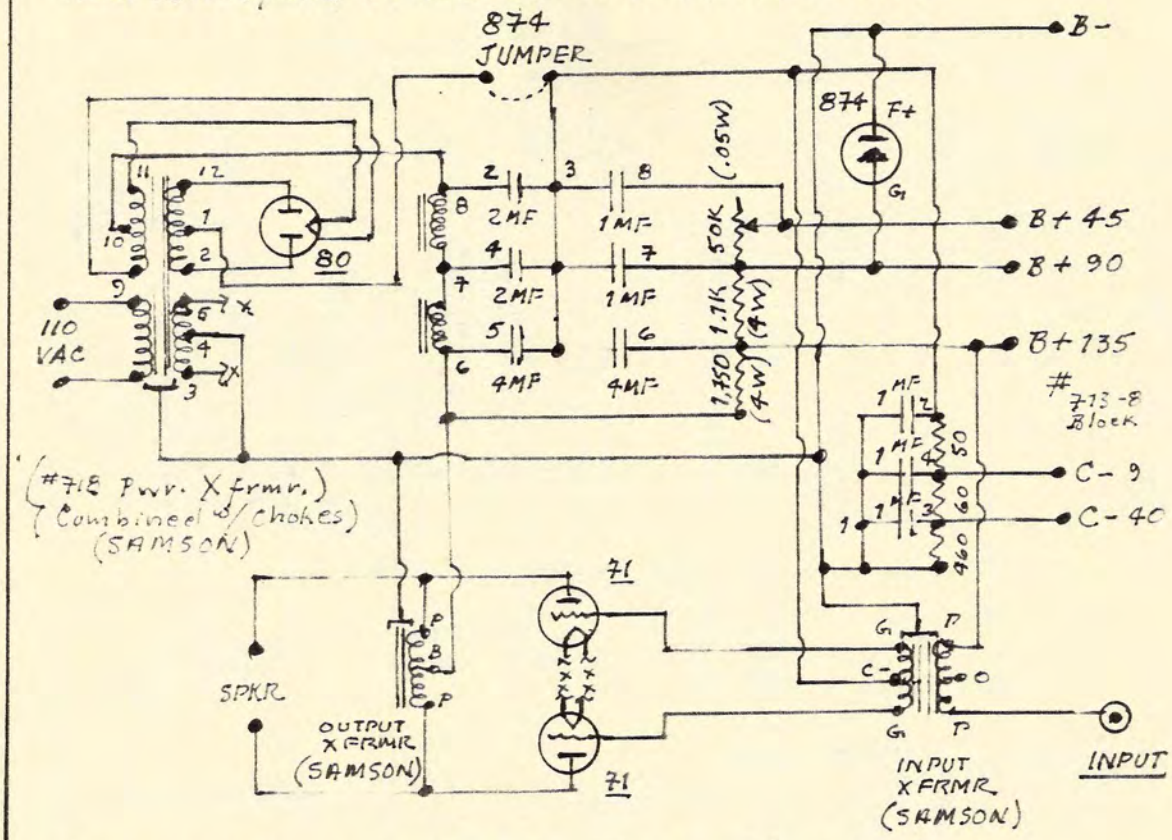
7. PANEL = (Optional)
8. BASEBOARD = 12" x 17" x 5/8".
9. TERMINAL STRIP = 1" x 14" x 3/16".

10. BENJAMIN SOCKETS #9040 (4).
11. 40' CORWICO "Braidite" WIRE.

12. EBY BINDING POSTS (10).



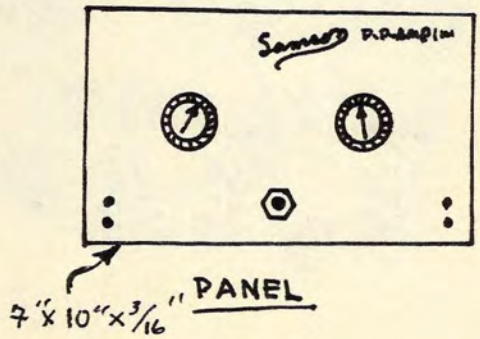
Nos. correspond to nos. on SAMSON & TOBE units.

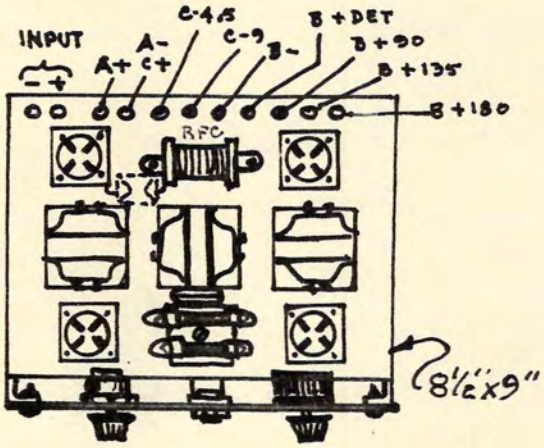


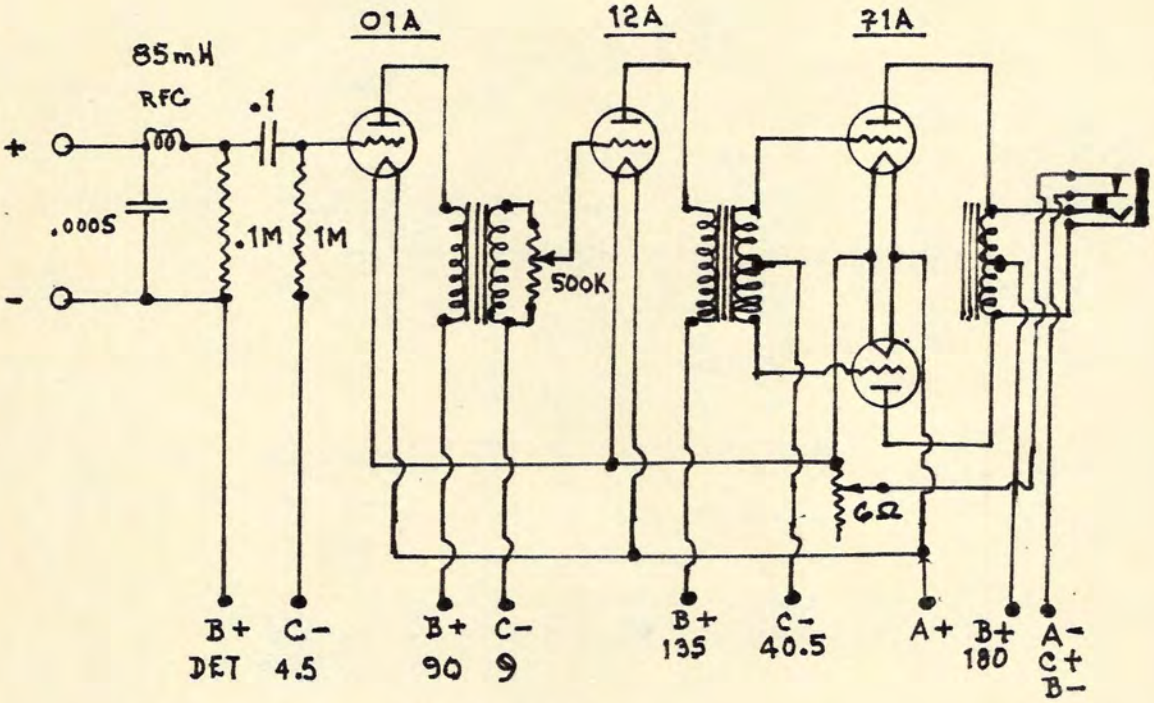
All wiring is under Baseboard, elevated by feet.

(CB SPR 28)

SAMSON PUSH-PULL AF AMPLIFIER, 1927

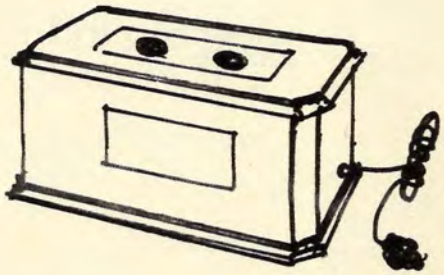


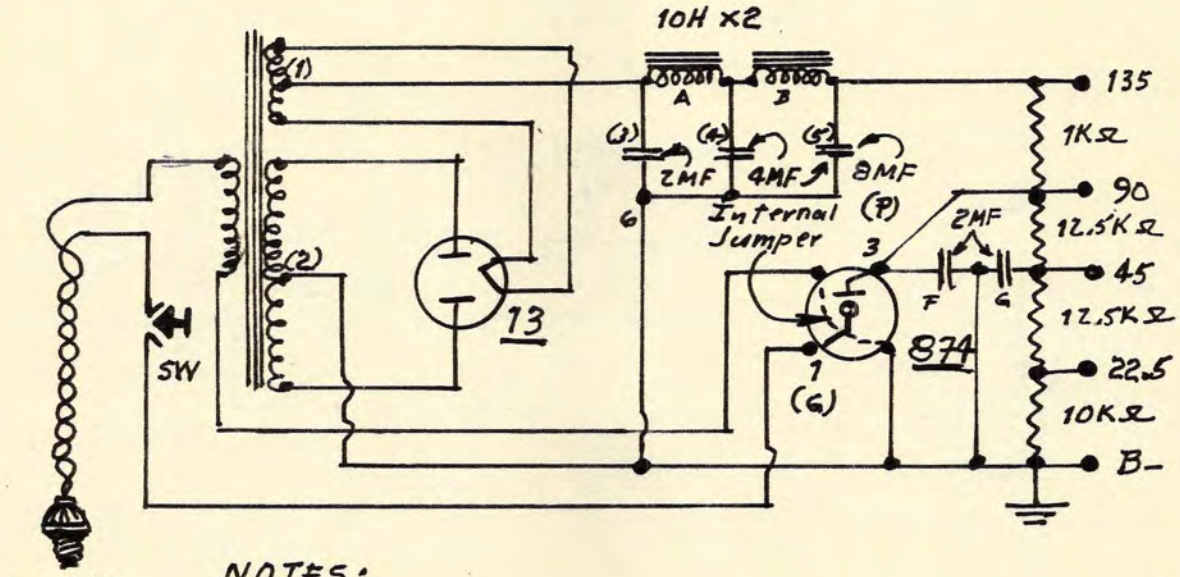




NOTES:
1. AF XFRMR. 3:1.
2. AF P-P XFRMR.
3. IMPEDANCE-TYPE XFRMR.
} SAMSON UNITS
4. SUB-PANEL MNTD. ON BENJAMIN BRKTS.

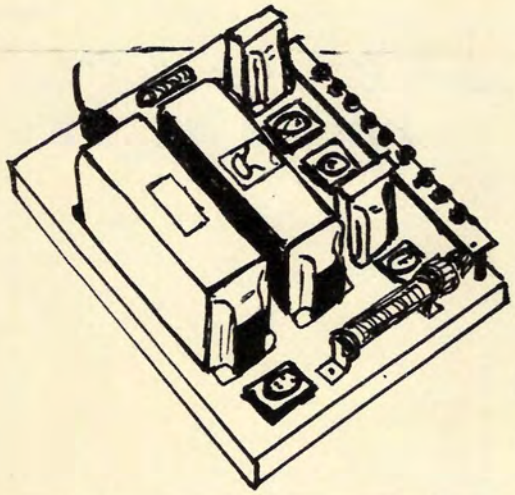
RCA B-ELIMINATOR
Model AP-937
(Duo-Rectron)





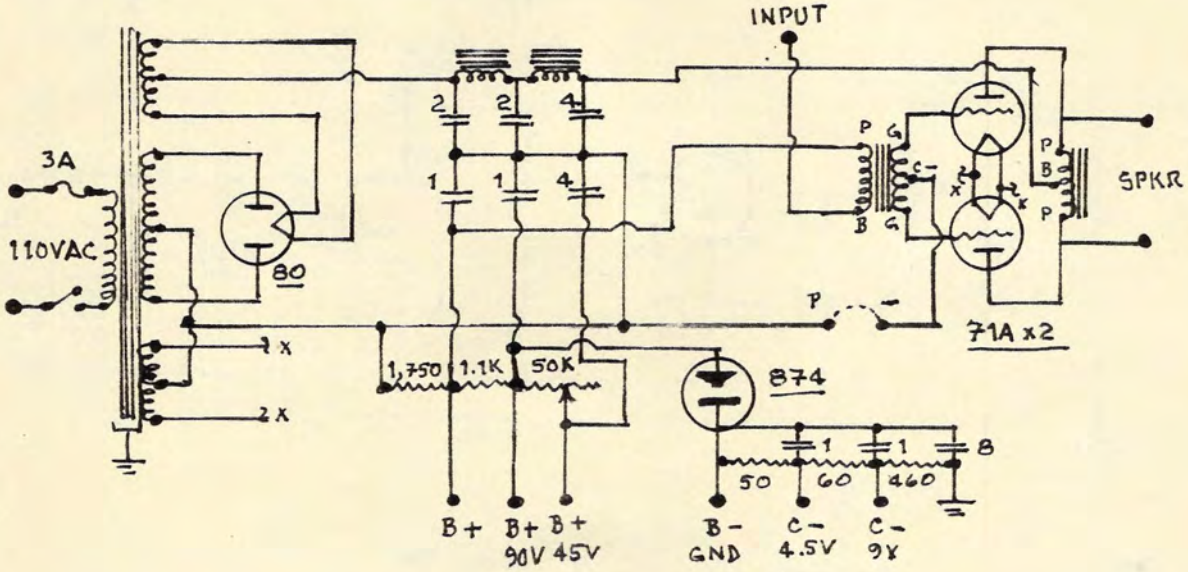
NOTES:

1. Circuit is closed when 874 is inserted.
2. A 13B may be substituted for the 13, but NOT a 13A. A 16B can also be used @ low power.
3. Single digit nos. = RCA nos. on unit. (1) etc.
4. RCA "Uni-Rectron" is NOT a B-eliminator, but is an audio power amplifier. Parts are not interchangeable.
5. Original solid electrolytics should be replaced by modern tubular electrolytics, rated @ 1KV, min.
6. Unit works best w/ load of 65 to 80 mA.
7. Power CLAROSTATS (500K each) may be used in lieu of voltage dividers; 3 required.



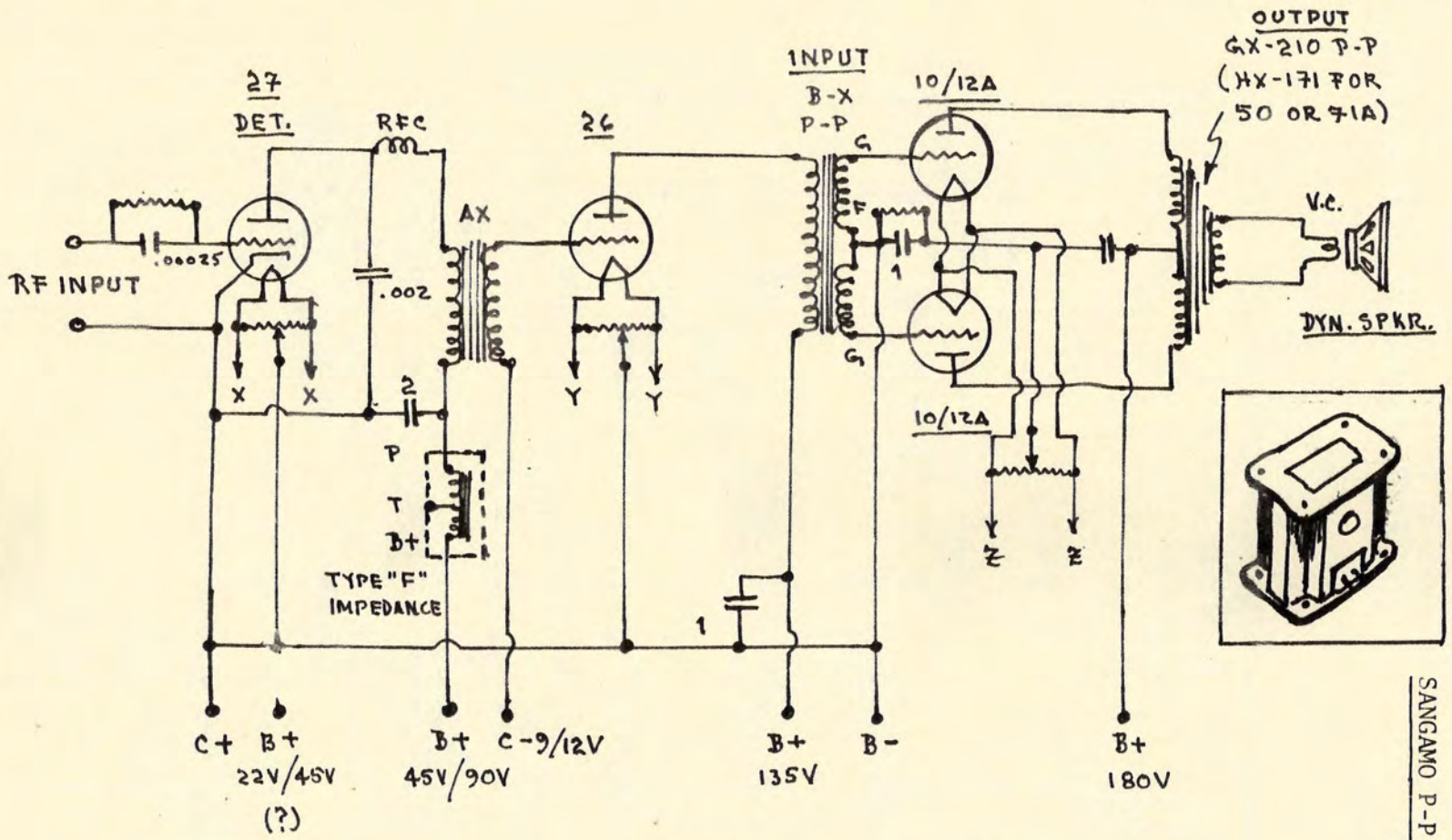
SAMSON POWER SUPPLY

1. Pwr. resistors by Hardwick-Field.
2. Samson 718 pwr. xfrmr.
3. Samson P-P output xfrmr.
4. Samson AF input xfrmr.
5. Tobe 713 filter block.
6. Baseboard = 12" x 17" x 5/8".
7. Terminal strip = 1" x 14" x ¼".



NOTE: Connexion is made when the 874 is inserted in its socket. Wiring is under baseboard, which was elevated by bumpers.

(CB 3-28)

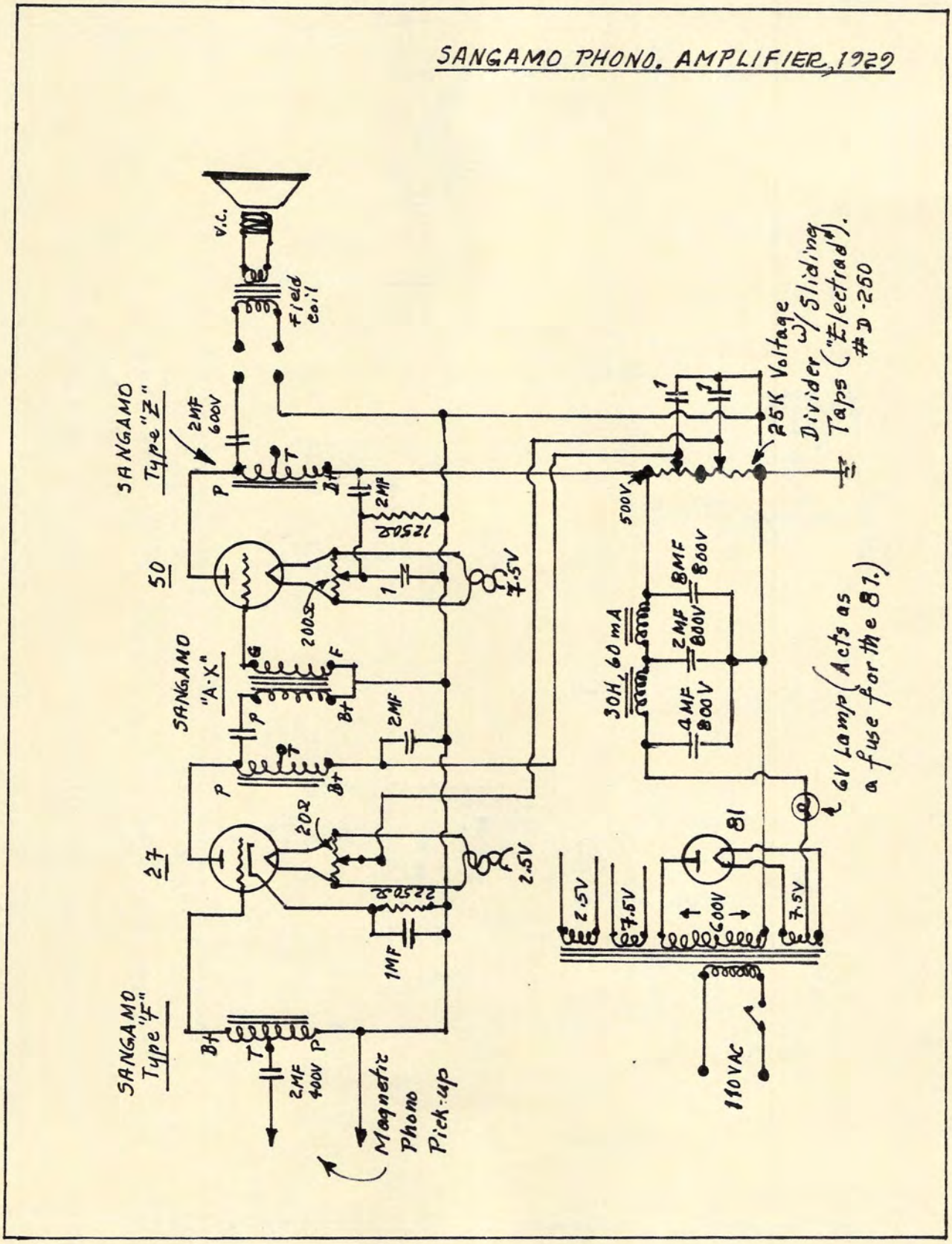


FIL. VOLT. { X-X = 2.5 VAC
Y-Y = 1.5 "
Z-Z = 5V/7.5 VAC

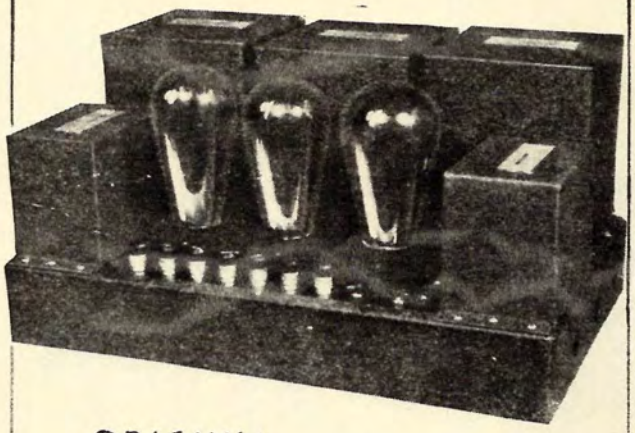
SANGAMO P/NOS. SHOWN.
OUTPUT IMPEDANCE TO
MATCH PWR. TUBE USED.

SANGAMO P-P AF AMPLIFIER
(1928; $25)

This amplifier was a bit different in that it incorporated a Detector.


SANGAMO PHONO. AMPLIFIER, 1929
V.C.
Field coil
SANGAMO Type "Z"
2MF 600V
T
P
B+
2MF
125Ω
50
7.5V
200Ω
SANGAMO "A-X"
G
F
2MF
27
20Ω
2.5V
225Ω
1MF
SANGAMO Type "F"
2MF 400V
Magnetic Phono Pick-up
25K Voltage Divider w/ Sliding Taps ("Electrad" #D-250)
500V
8MF 800V
2MF 800V
4MF 800V
30H, 60mA
81
600V
7.5V
6V Lamp (Acts as a fuse for the 81.)
110VAC

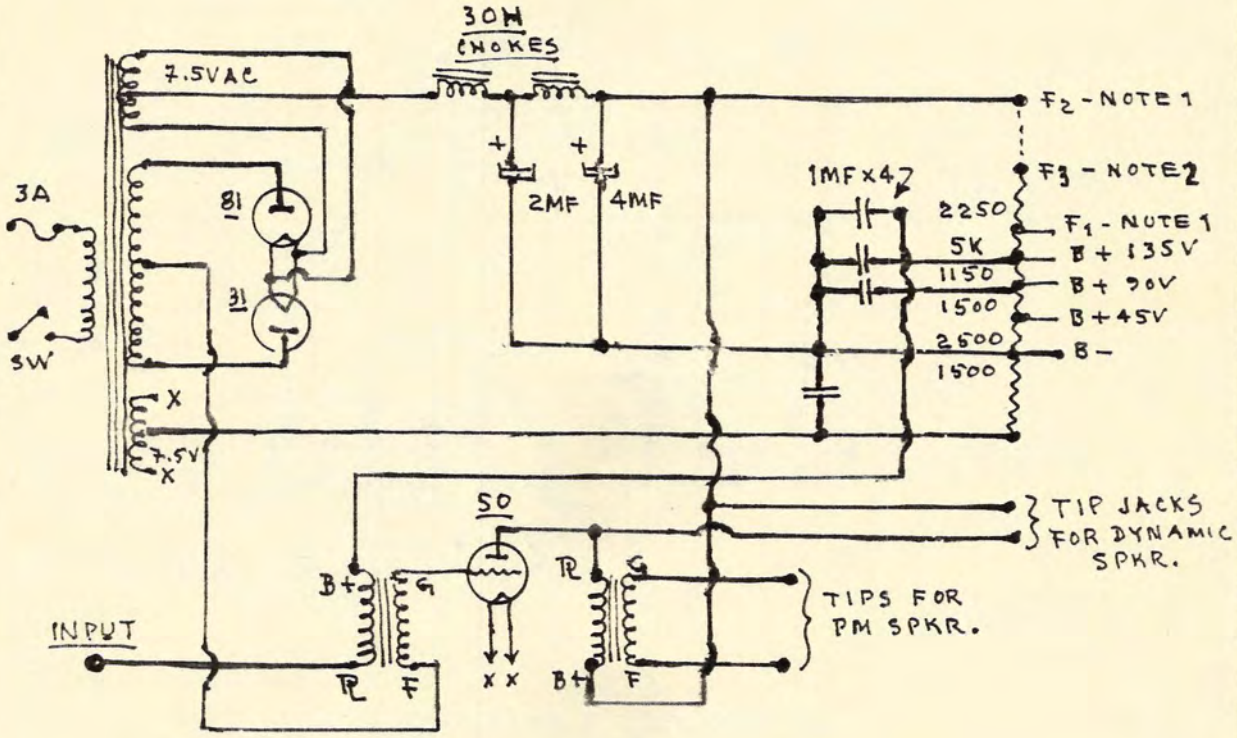
SCOTT "WORLD RECORD SHIELD-GRID 9"
POWER AMPLIFIER (1928)



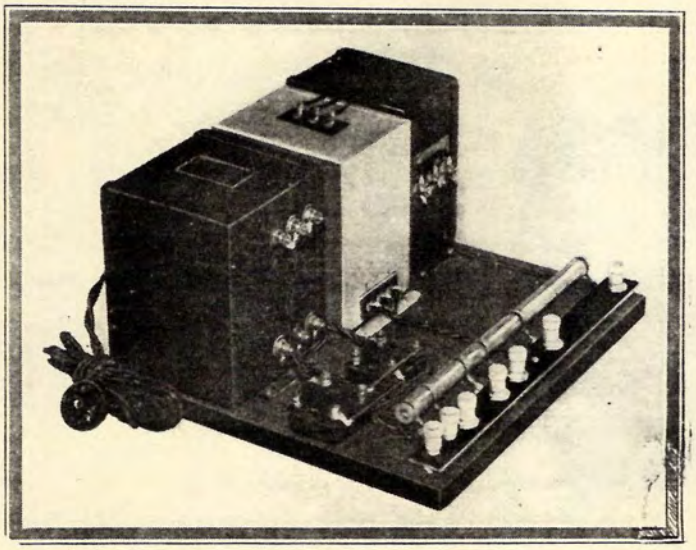
ORIGINAL
CONFIGURATION
(16GA. STL. BASE)

NOTES

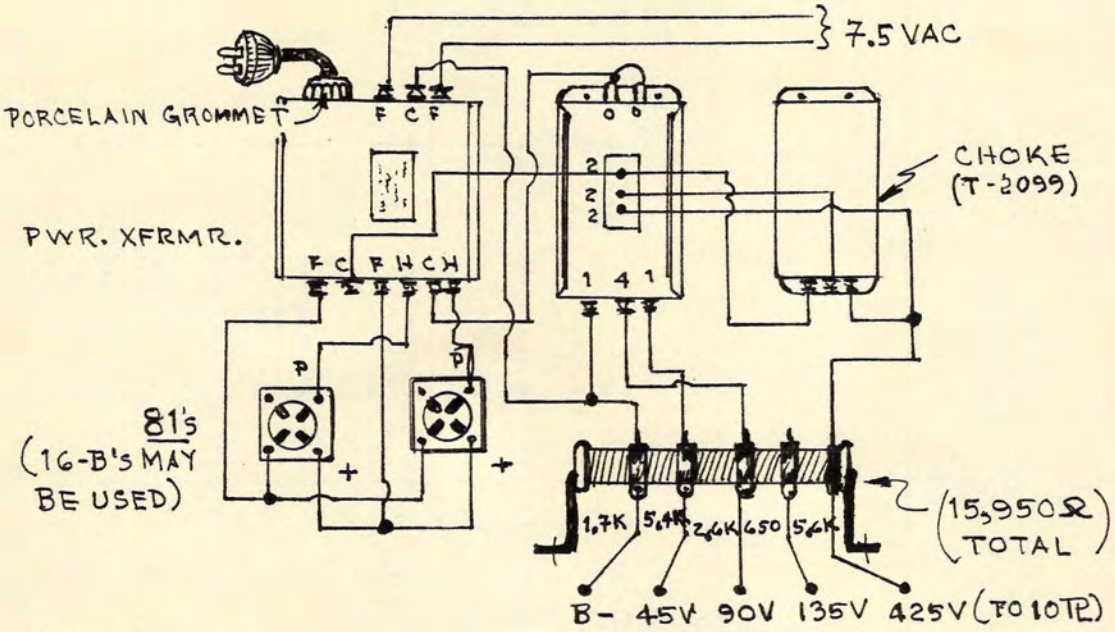
1. Connect F1 & F2 together when employing the Field Coil of a Dynamic Spkr.
2. Connect F2 & F3 when employing a PM spker. voice coil.



SCOTT "WORLD RCVR. SUPER-TEN", 1928
POWER SUPPLY



(9"x12"x5/8" BASE)



C = C.T.
F = FIL.
H = H.V.

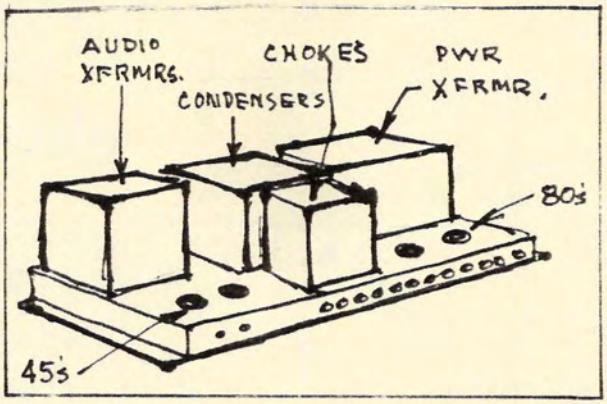
PWR. XFRMR = THORDARSON 2098.
CHOKE COILS = " 2099.
COND. BLK. = TOBE R-210.
VOLT. DIVIDER = CARTER 5-20-M.

SCOTT AC TEN POWER AMPLIFIER, 1929
(Sht. 2)

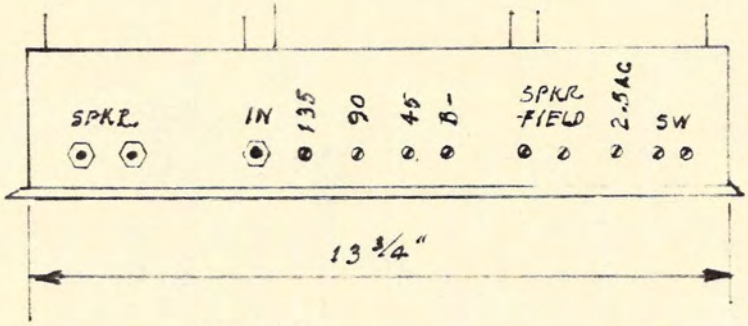
GENERAL NOTES:

1. Twist all AC leads.
2. Original Scott dynamic speaker was 90VDC type.
3. Chassis, steel = 8.5" x 13.75" (O/A hght. = 7").
4. Hum Elimination: place a large sheet of copper or aluminum under power supply and connect sheet to a good ground.
5. Original Wire Colour Code:

Red/Blue	=	2.5VAC
Brn/Blk	=	110VAC
Blk	=	B-
Red	=	B+ 45VDC
Blue	+	B+ 90VDC
Yel	=	B+ 135VDC
Slate	=	Output

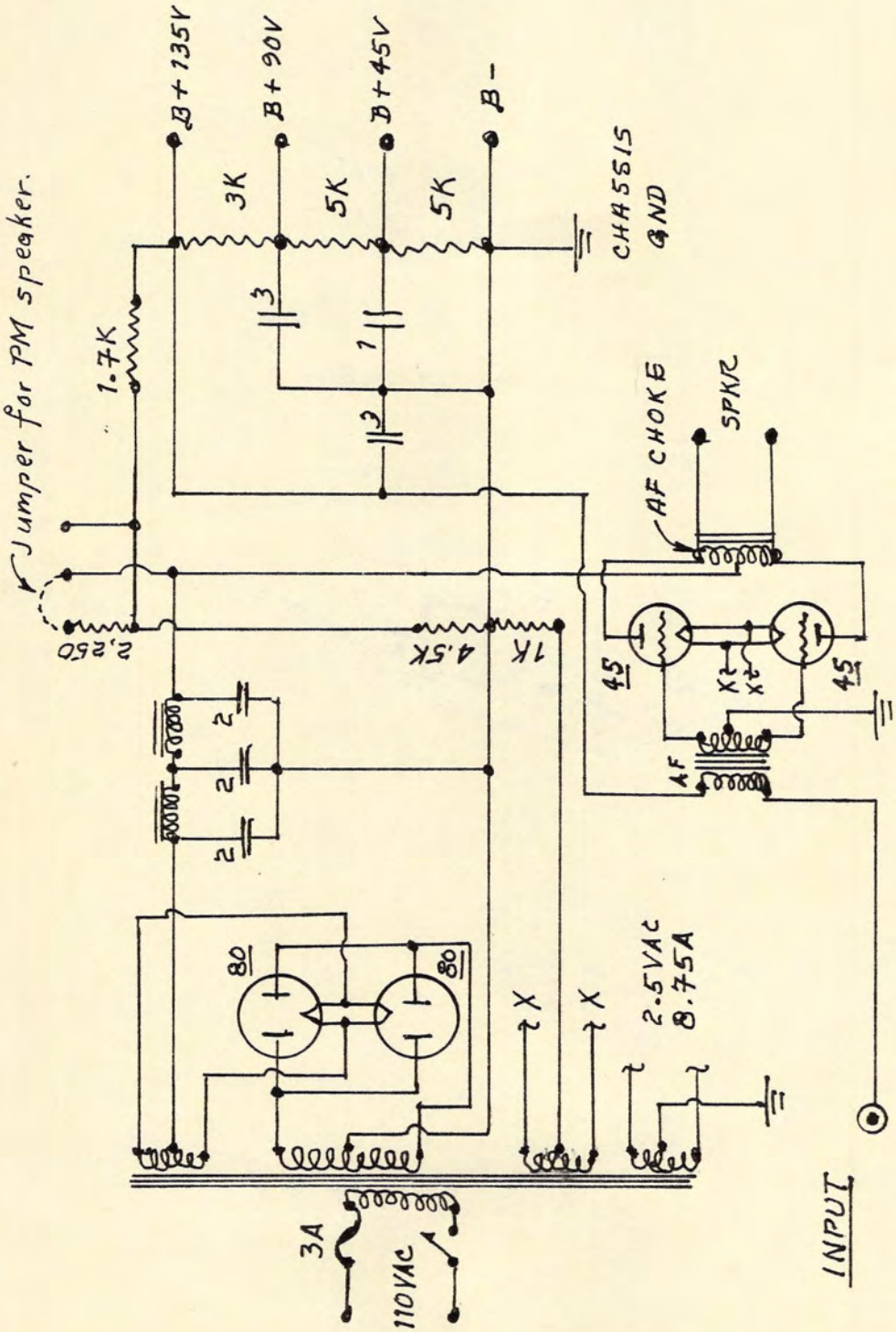


ORIGINAL CONFIGURATION

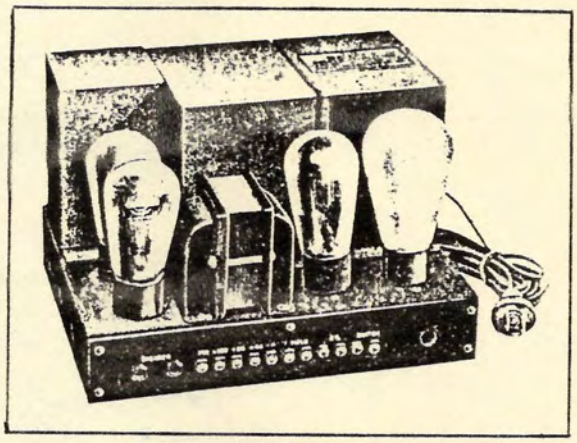


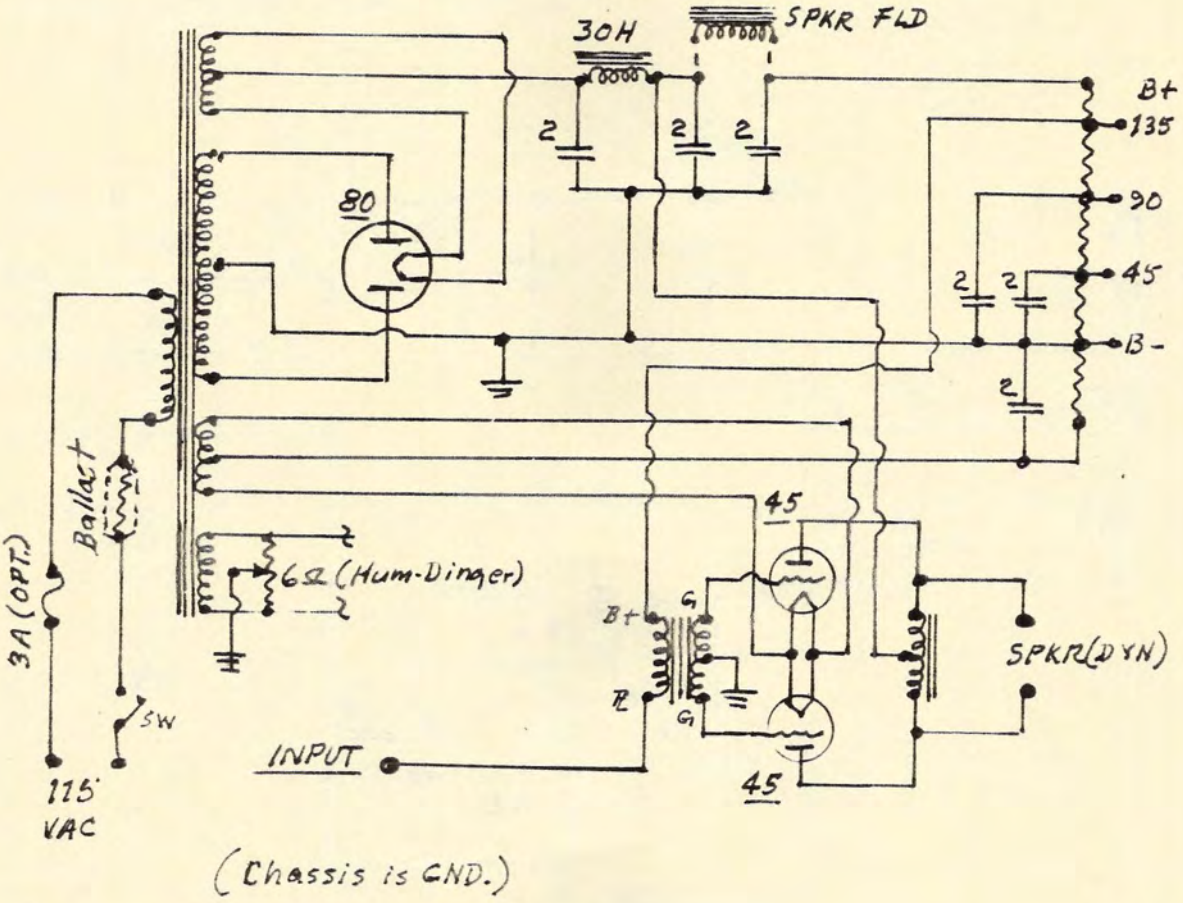
TERMINAL STRIP

SCOTT POWER AMPLIFIER, 1929



SCOTT S.G. AC POWER AMPLIFIER





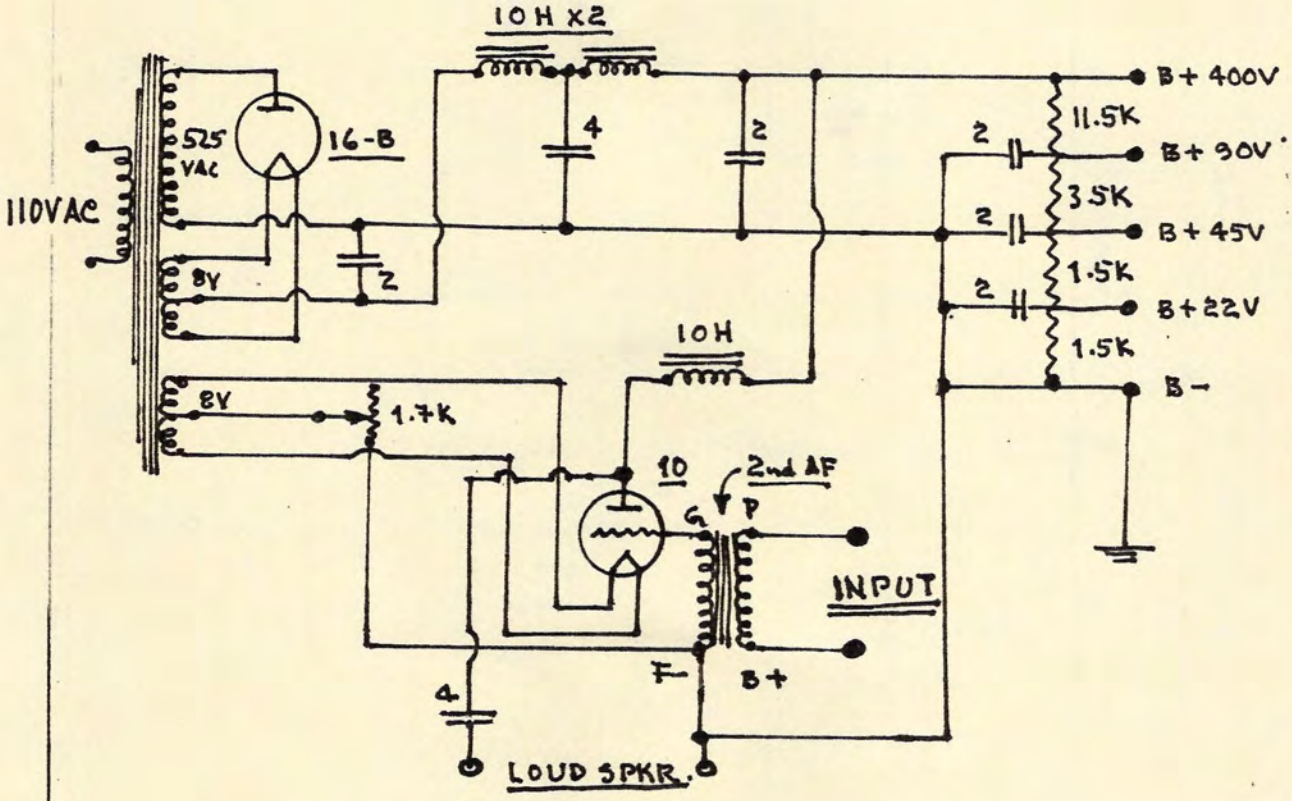
(SCOTT FILE)

16-B POWER AMPLIFIER, 1926 VERSION

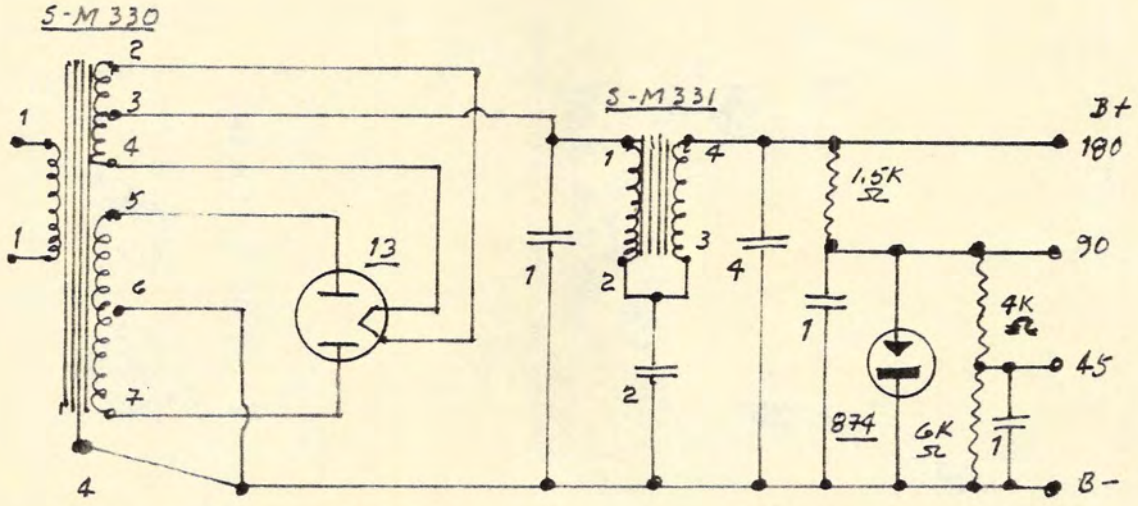
The 16-A and 16-B were ubiquitous tubes in the early days, and the 16-B enjoyed a brief popularity as an AC rectifier - until the advent of the Raytheon gaseous rectifier.

The 16-B was capable of taking a very high voltage (for the times) on its plate, although its life-expectancy wasn't too impressive.

Several manufacturers of popular (cheap) sets used the 16-B in their power supplies. The schematic below, for example, was favoured by Crosley.

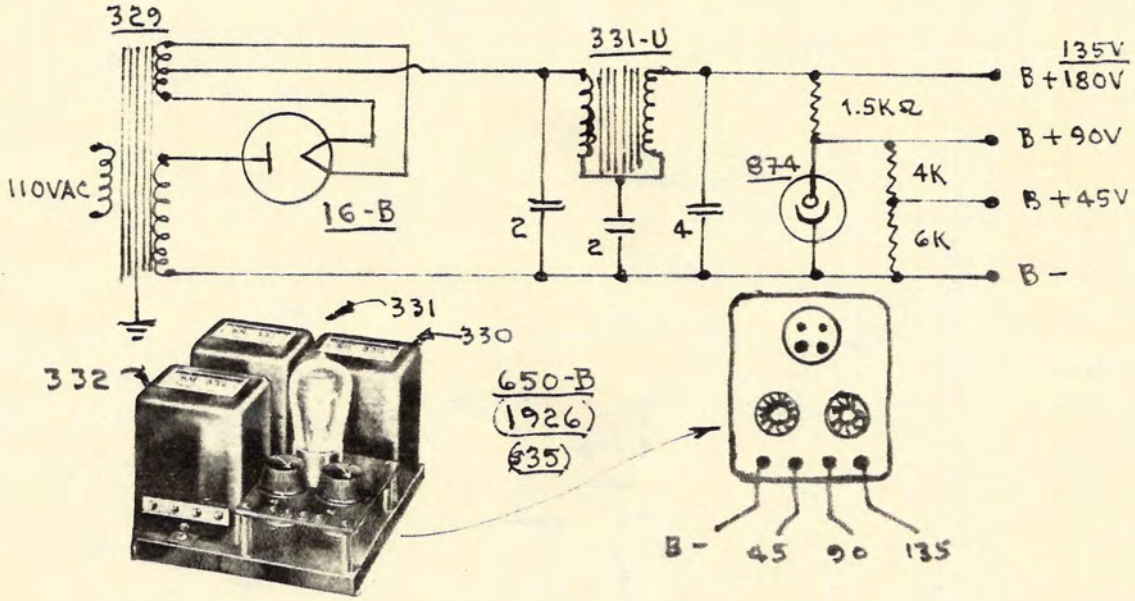


S-M 652 RESERVOIR B, 1927

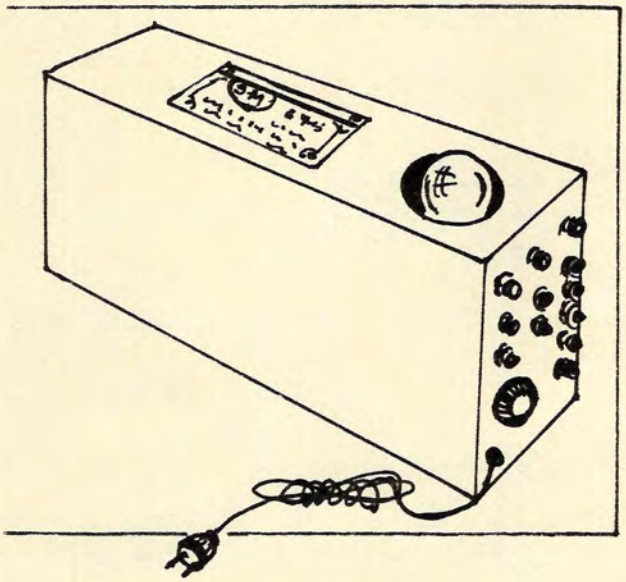


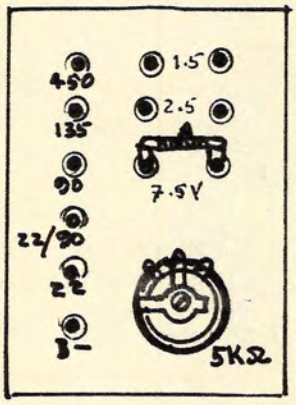
Original Price = $34.50.

S-M 650, 1924



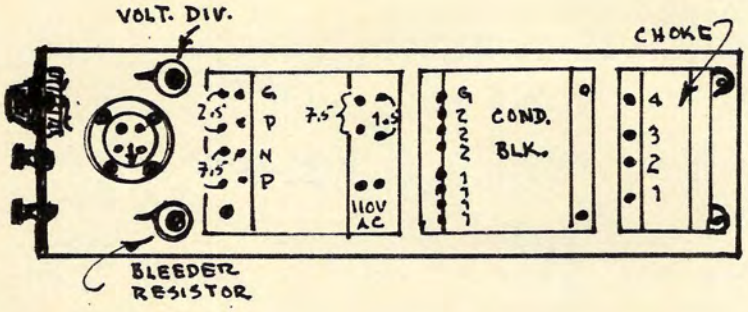
S-M #675 A-B-C SUPPLY, 1929





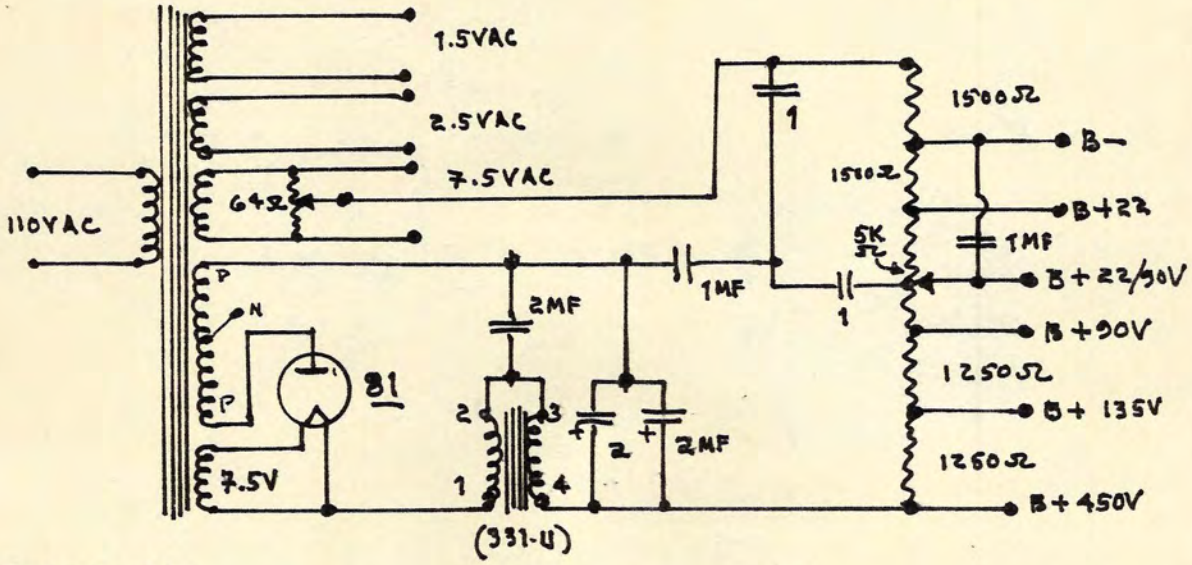
REAR VIEW
OF PANEL

(12 BIND. POSTS)



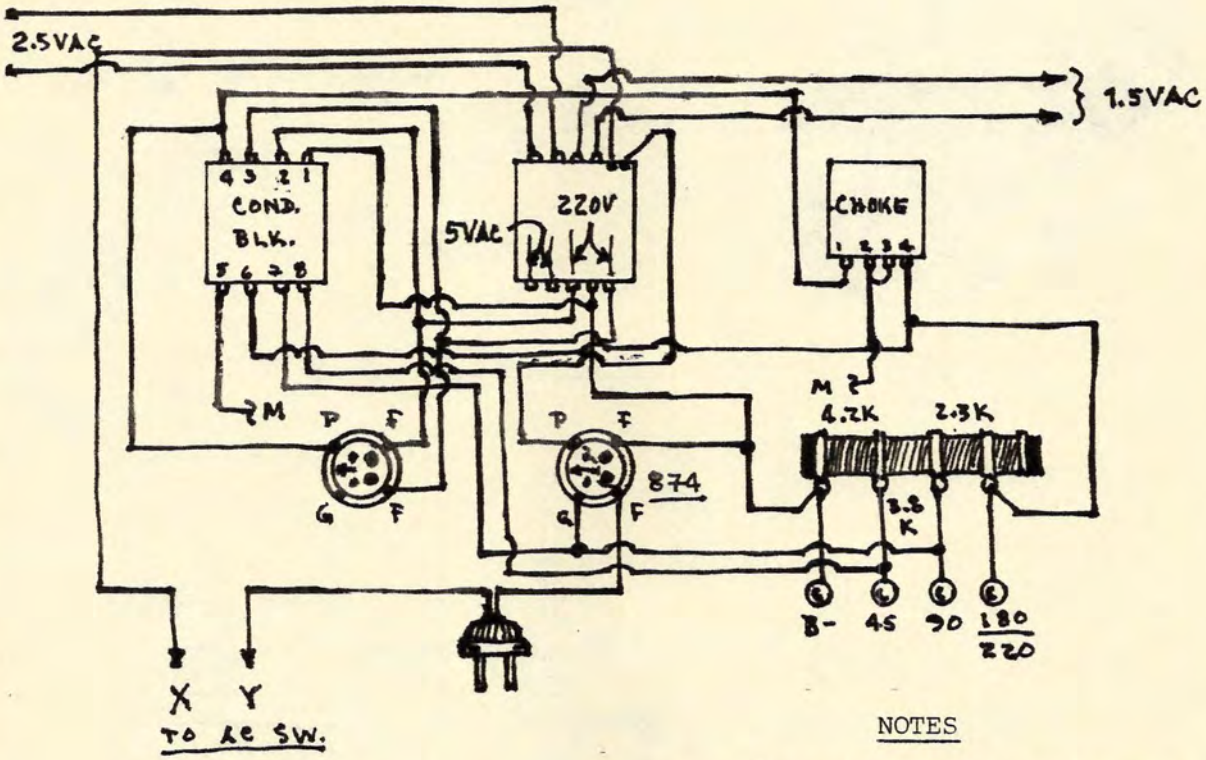
VOLTAGE W/O LOAD:

22V = 55V
90V = 210V
135V = 250V
450V = 510V



(RW 1·12·29)

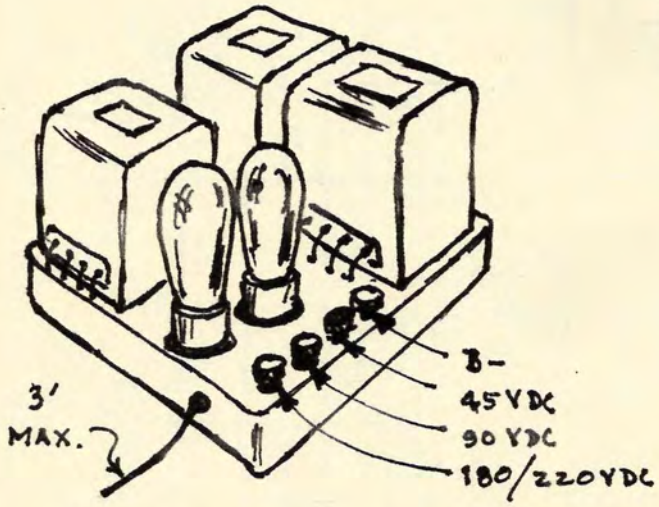
S-M "SHIELDED SIX" POWER SUPPLY, 1927



NOTES

1. C-Bias obtained throught set.
2. Circuit completed when 874 is inserted in socket.

Q-R-S F/W Rectifer Tube.
874 V.R. Tube.
7" x 7" steel base-plate.
S-M 329-A Power Xfrmr.
331 Chokes (2)
511 Filer Block.

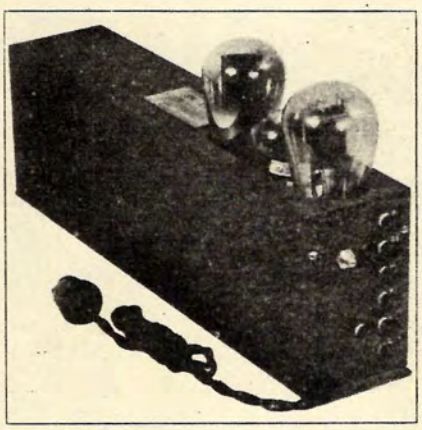


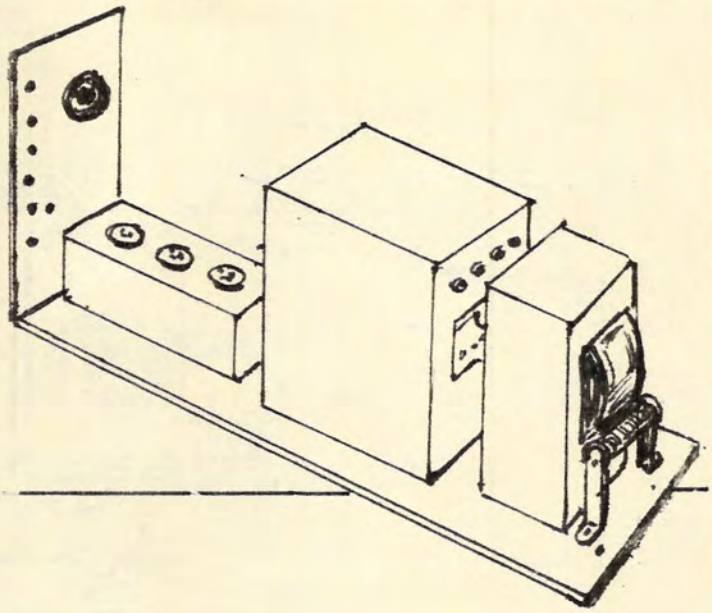
(Refer to Vol. II-B for Rcvr. Schematic.)

ORIGINAL PARTS (1926)

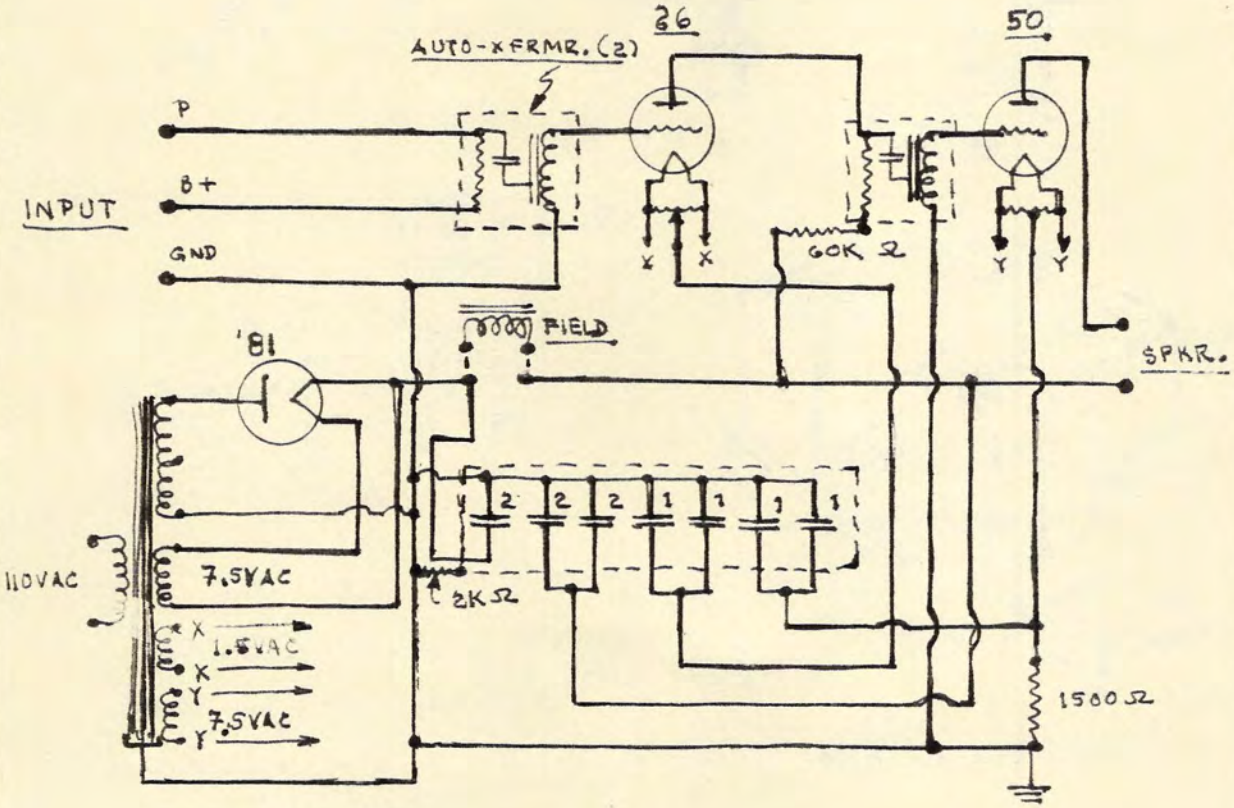
S-M 329-A Power Xfrmr.
331 "Uni-Choke".
332 (TOBE) Cond. Block.
374 V.R. Tube (Cunningham).

SILVER-MARSHALL POWER AMPLIFIER, 1929

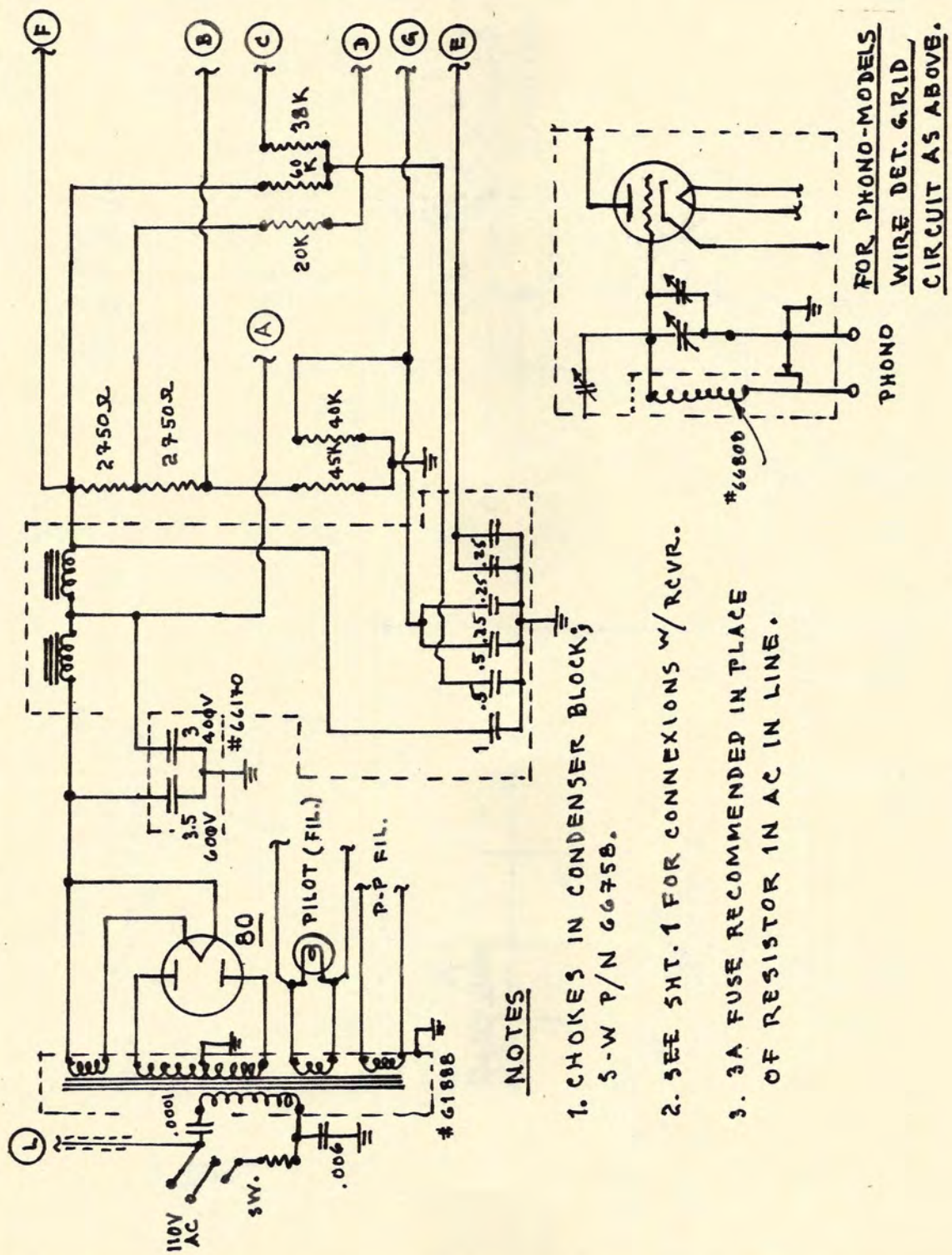




3.5"W x 5.5"H x 17"L
CRACKLE-FINISH STL. CASE

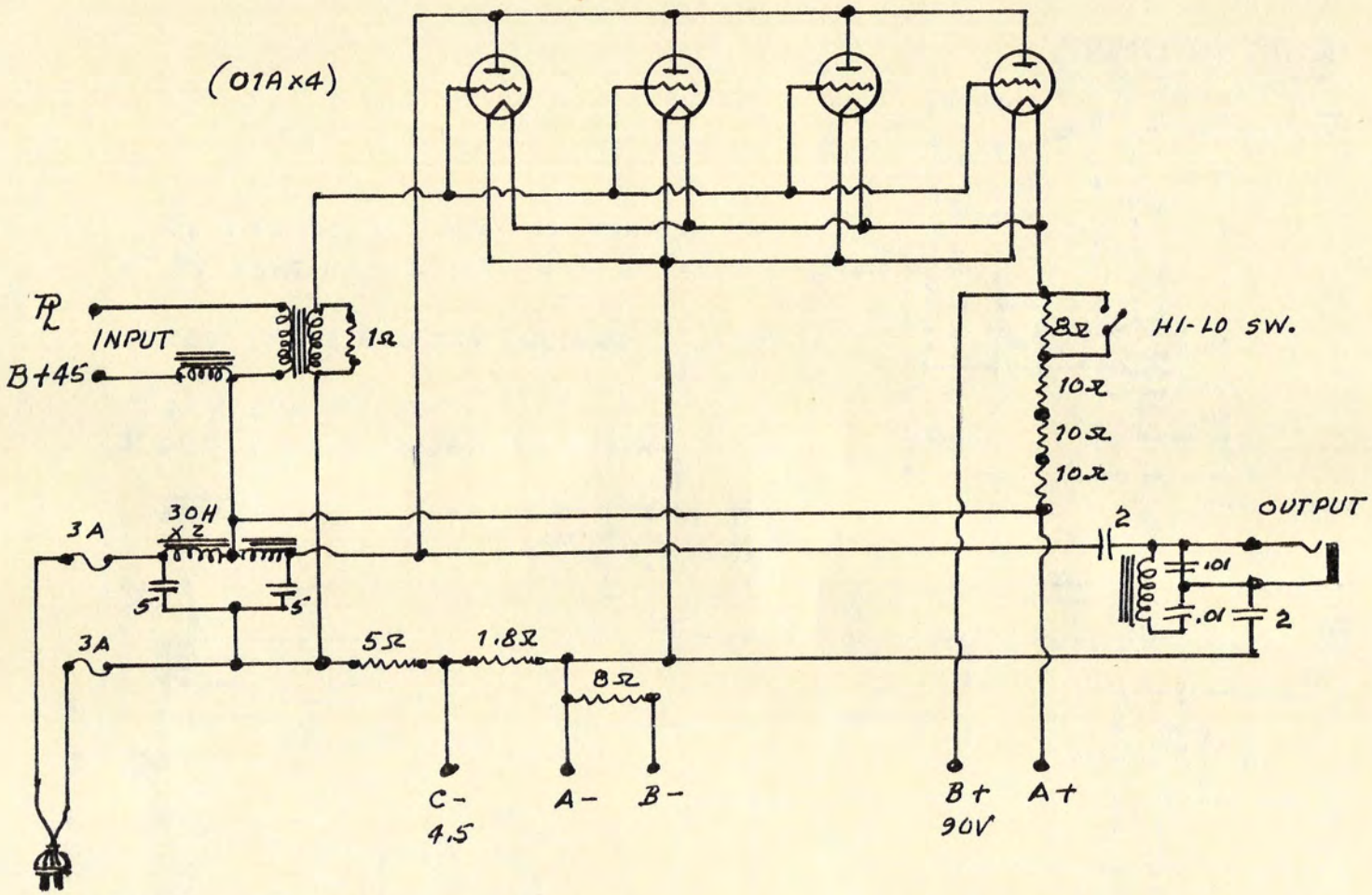


STEWART-WARNER Model R-100 POWER SUPPLY



NOTES

1. CHOKES IN CONDENSER BLOCK; S-W P/N 66758.
2. SEE SHT. 1 FOR CONNEXIONS W/RCVR.
3. 3A FUSE RECOMMENDED IN PLACE OF RESISTOR IN AC IN LINE.

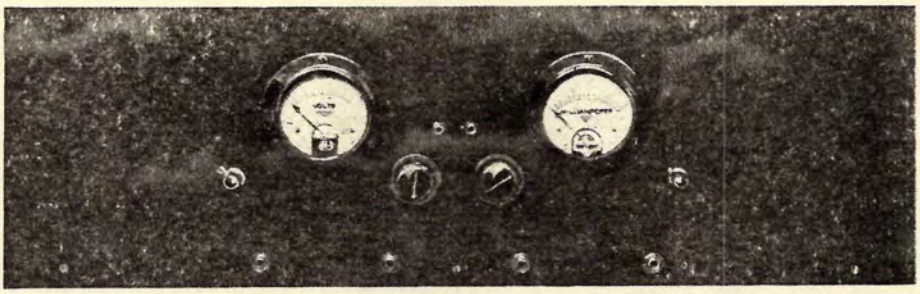


A most peculiar circuit.

5-C D-968
(1925)

STROMBERG-CARLSON D-968 AF AMPLIFIER, 1926

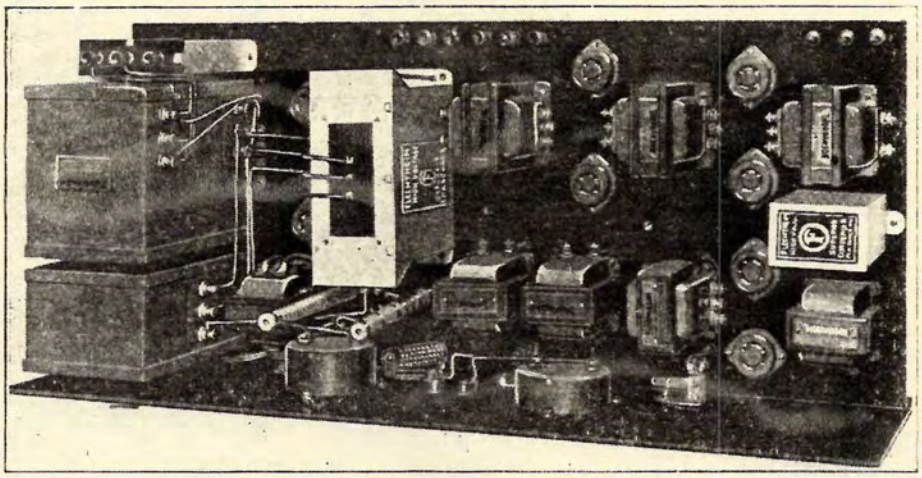
(Sht. 1) THE SUPREME POWER AMPLIFIER, 1929



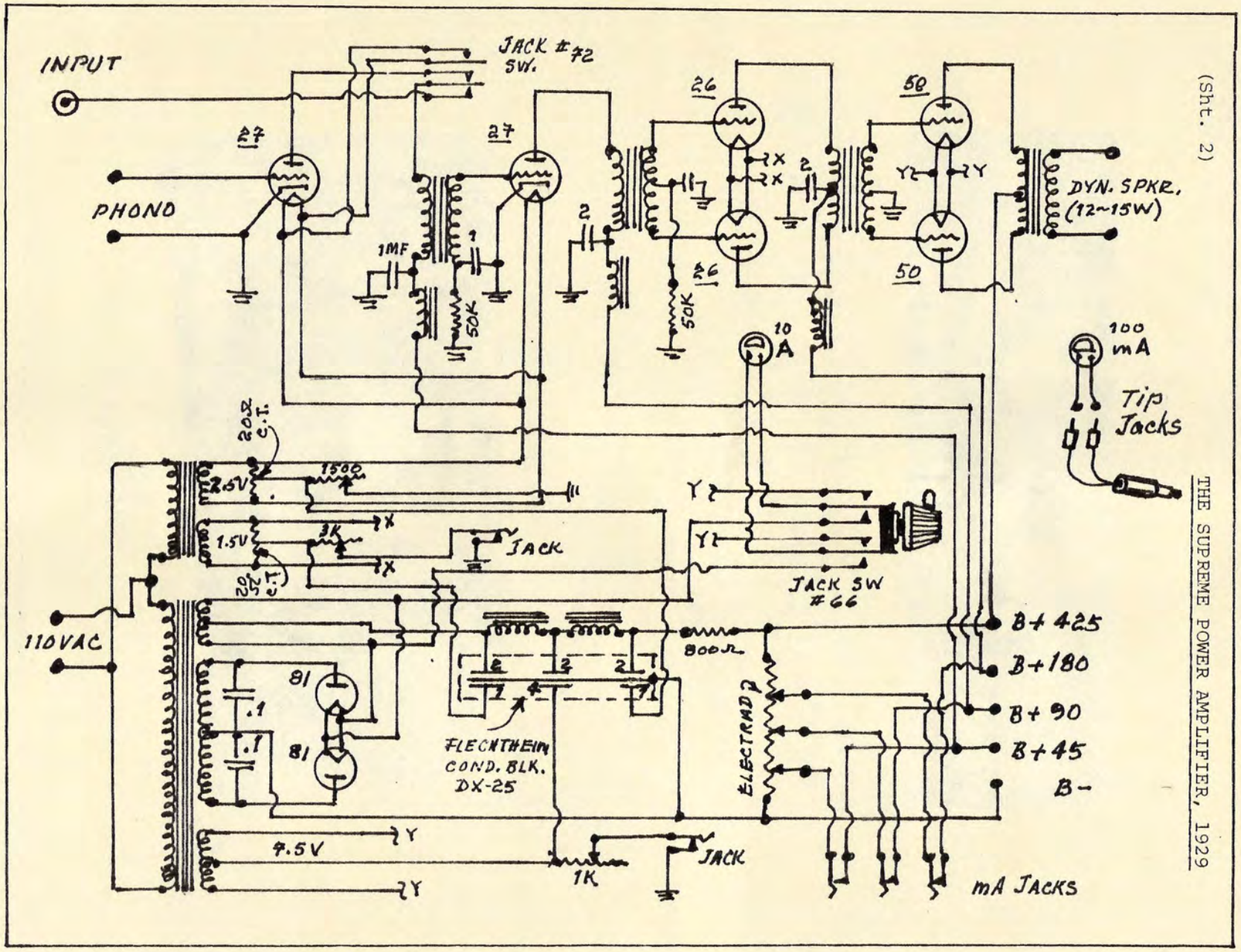
This remarkable unit was originally designed for placement behind a movie-house screen, with the advent of "talkies"; playing recorded dialogue and music in synchronisation with the film - hopefully.

The recordings were played at 33 RPM, and the audio output of this amplifier was an undistorted 25 watts. It would blanket an auditorium holding 2,500 people. It also supplied ample power as a B-eliminator, with a top B+ voltage of 425V.

While essentially a THORDARSON deign, the other components were of comparable quality, and the placement of parts, shown in the illustration below, was carefully thought out. If you have, or can come by all of the THORDARSON items, you will find that constructing the Supreme Power Amplifier well worthwhile, and a real surprise.



ANGLED PLAN VIEW



(Sht. 2)

THE SUPREME POWER AMPLIFIER, 1929

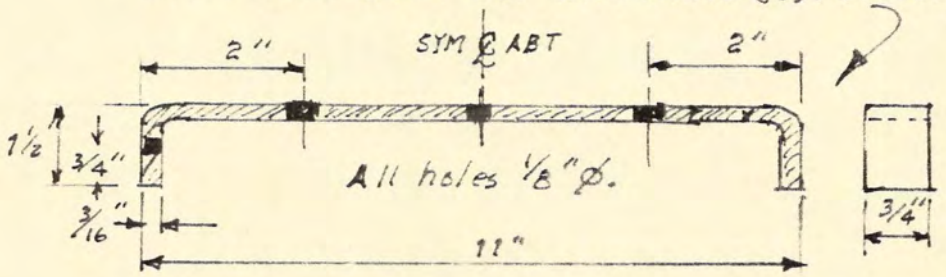
(Sht. 3) THE SUPREME POWER AMPLIFIER, 1929

MAJOR PARTS LIST

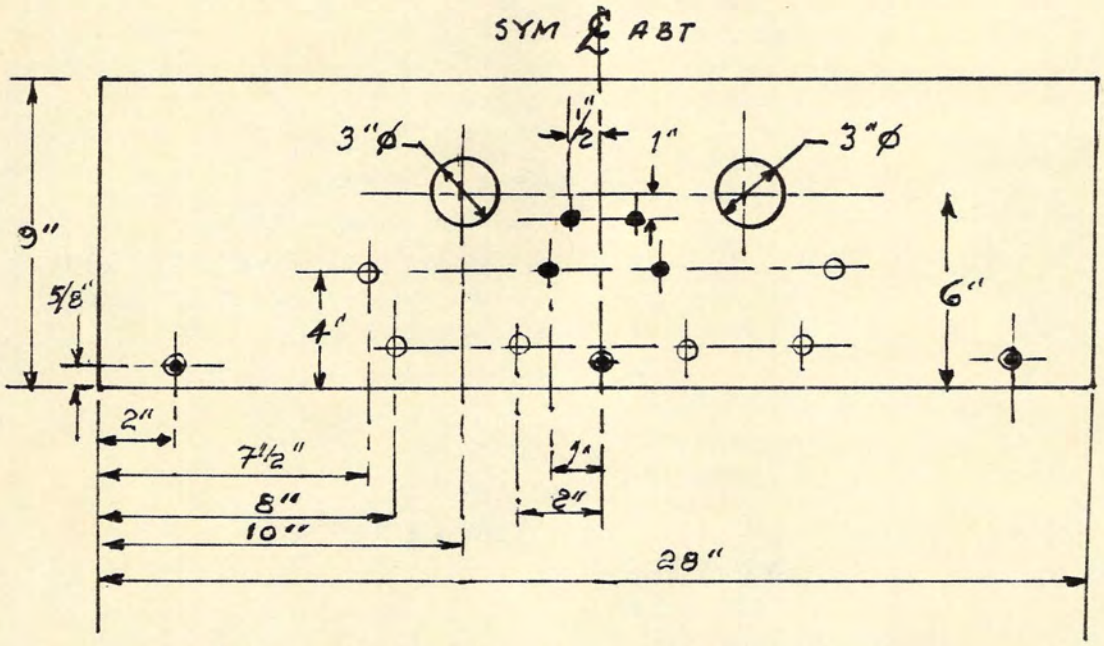
THORDARSON PWR. XFRMR. T2950.
" DUAL CHOKE T3100.
" AF XFRMR. R300.
" P-P INPUT XFRMR. T2922.
" P-P INTERMEDIATE XFRMR. T2973.
" OUTPUT XFRMR. T2903 (DYN. SPKR.)
" HI-IMP. CHOKE R190.
" FILTER CHOKES 196 (2).
JEWELL 0-10 AC VOLTMETER.
" 0-150 mAmmeter.
BENJAMIN 4-PRONG SOCKETS (6).
" 5-PRONG SOCKETS (2).
EBY BINDING POSTS (10).
ELECTRAD 20Ω C.T. RESISTORS (2).
CARTER 2A JACKS (5).
" 32A JACK SWITCH.
" 66 " "
" No. 10 TIP JACKS (2).
" PHONE TIPS (2).
" TU-WAY PHONE PLUG.
ALL BY-PASS = 200 V WORKING, EXCEPT
4 MF = 650 V, IN COND. BLK.

BAKELITE PANEL = 9" x 28" x 3/16".
" SUB-PANEL = 12" x 27" x 1/4".

SUB-PANEL SUPPORT BRACKETS (3): Brass.



(Sht. 4) THE SUPREME POWER AMPLIFIER, 1929

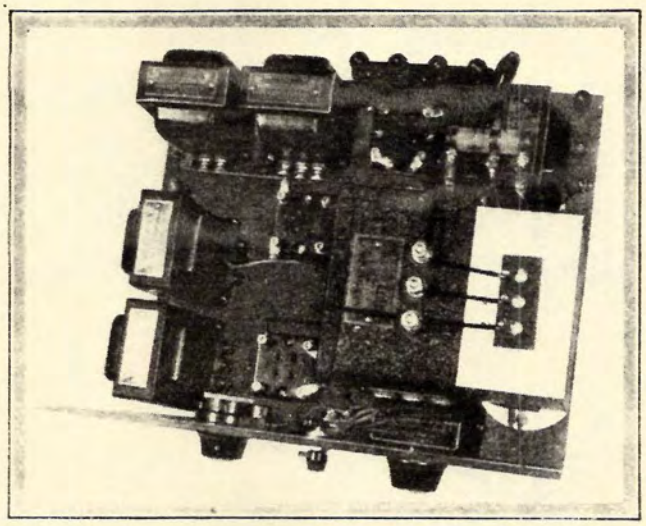


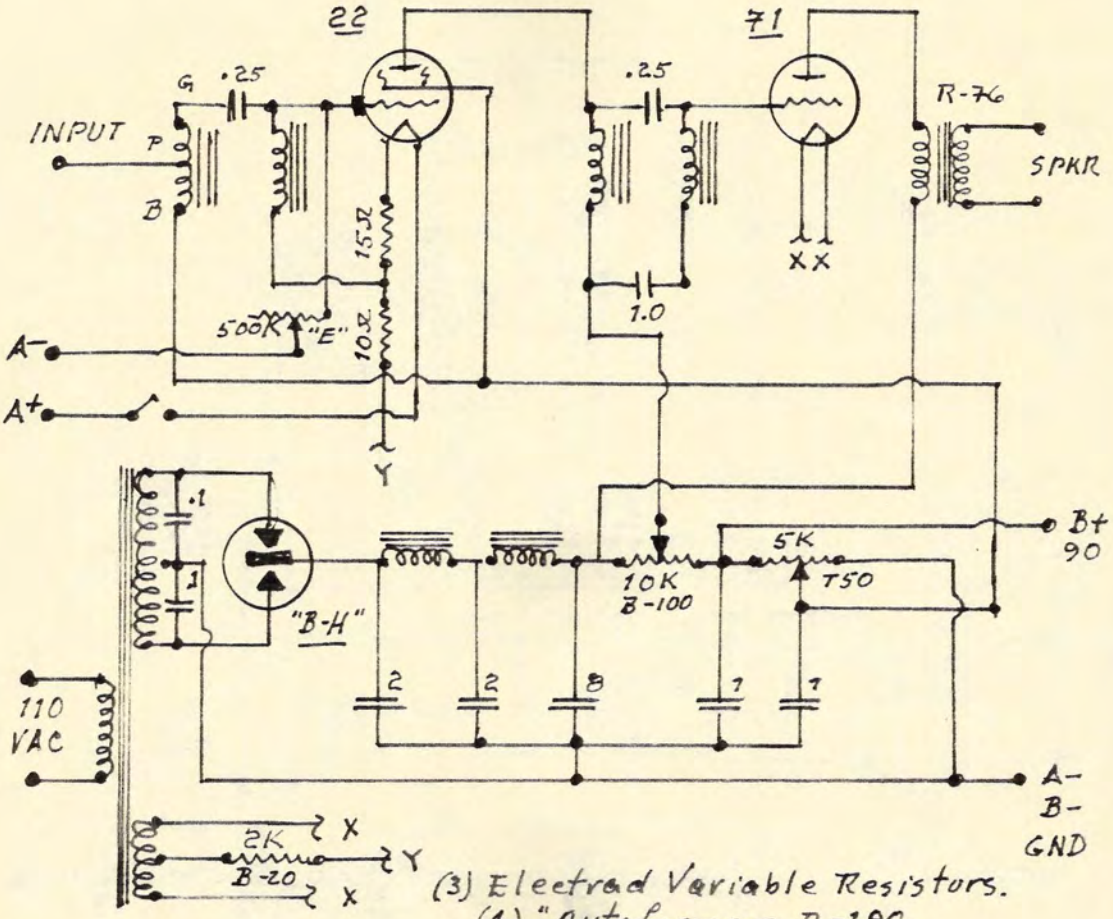
● = 3/8"ø(4) ○ = 7/16"ø(6) ⊙ = 1/8"ø CSK. (3)

PANEL HOLE PATTERN

THORDARSON SCREEN-GRID POWER AMPLIFIER, 1928

Base = 9 3/4" x 12" x 1/2"

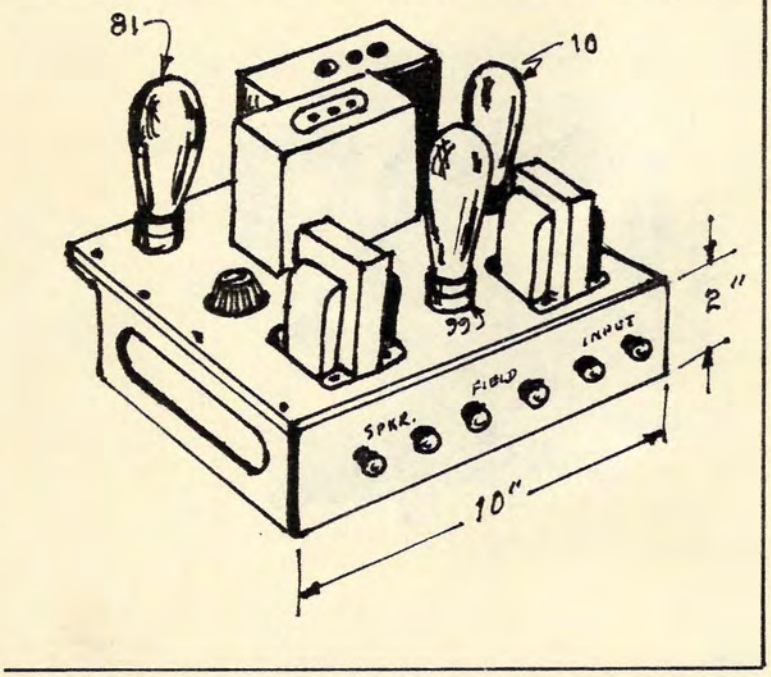




(3) Electrad Variable Resistors.
(4) "Autoformers, R-190.
R-171 Power Compact.

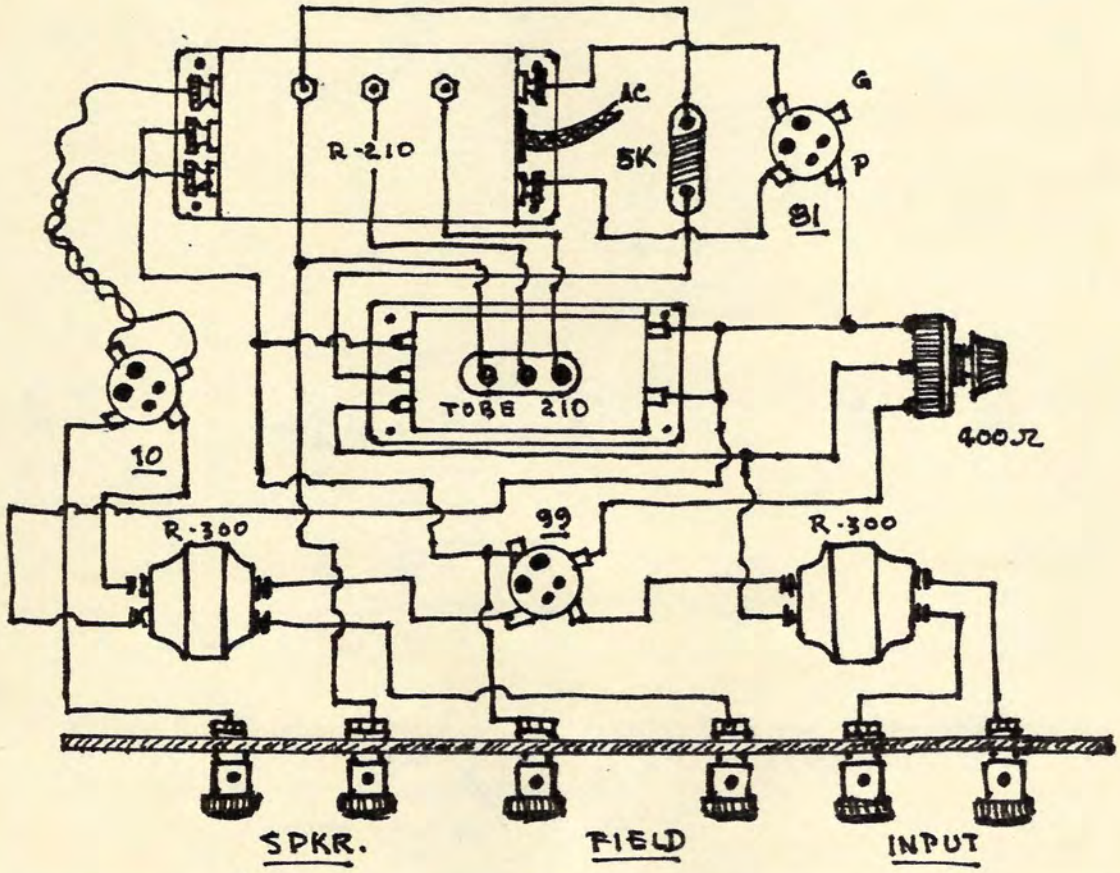
CCB-Spr. 28)

THORDARSON AF AMPLIFIER, 1929

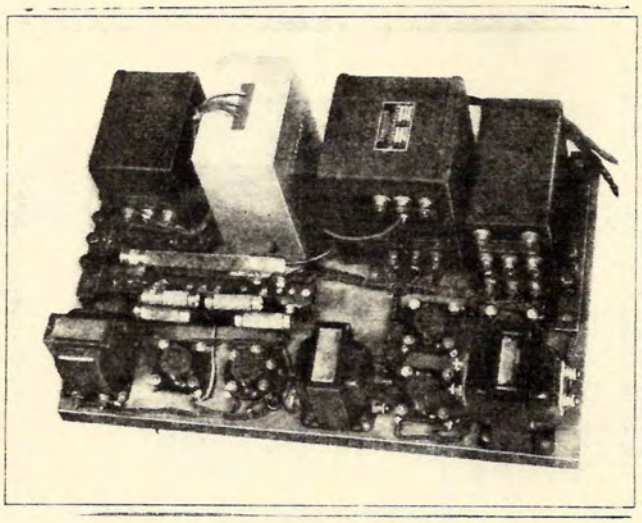


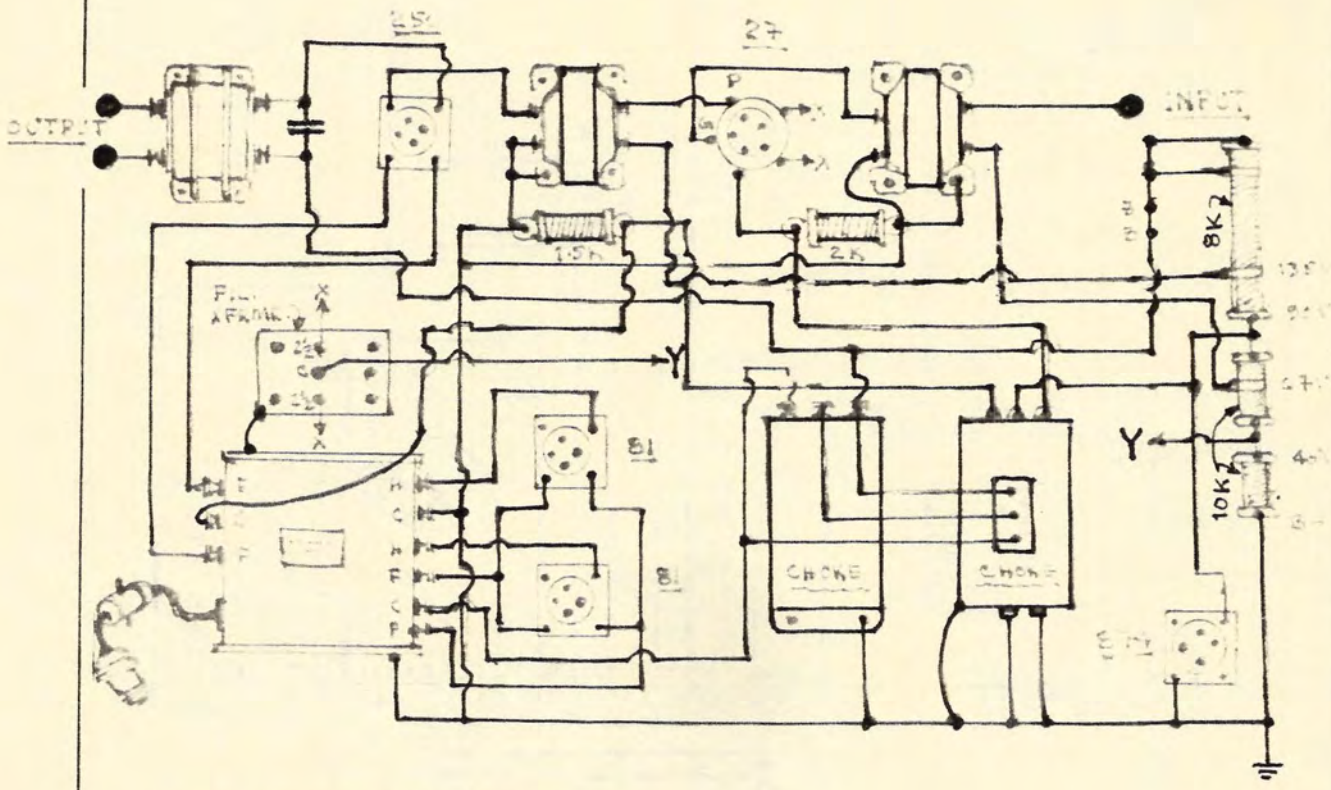
NOTES:

1. Thordarson & Tobe part nos. shown.
2. 10" x 10" x 2" O.A.
3. Bakelite panel & sub-panel.

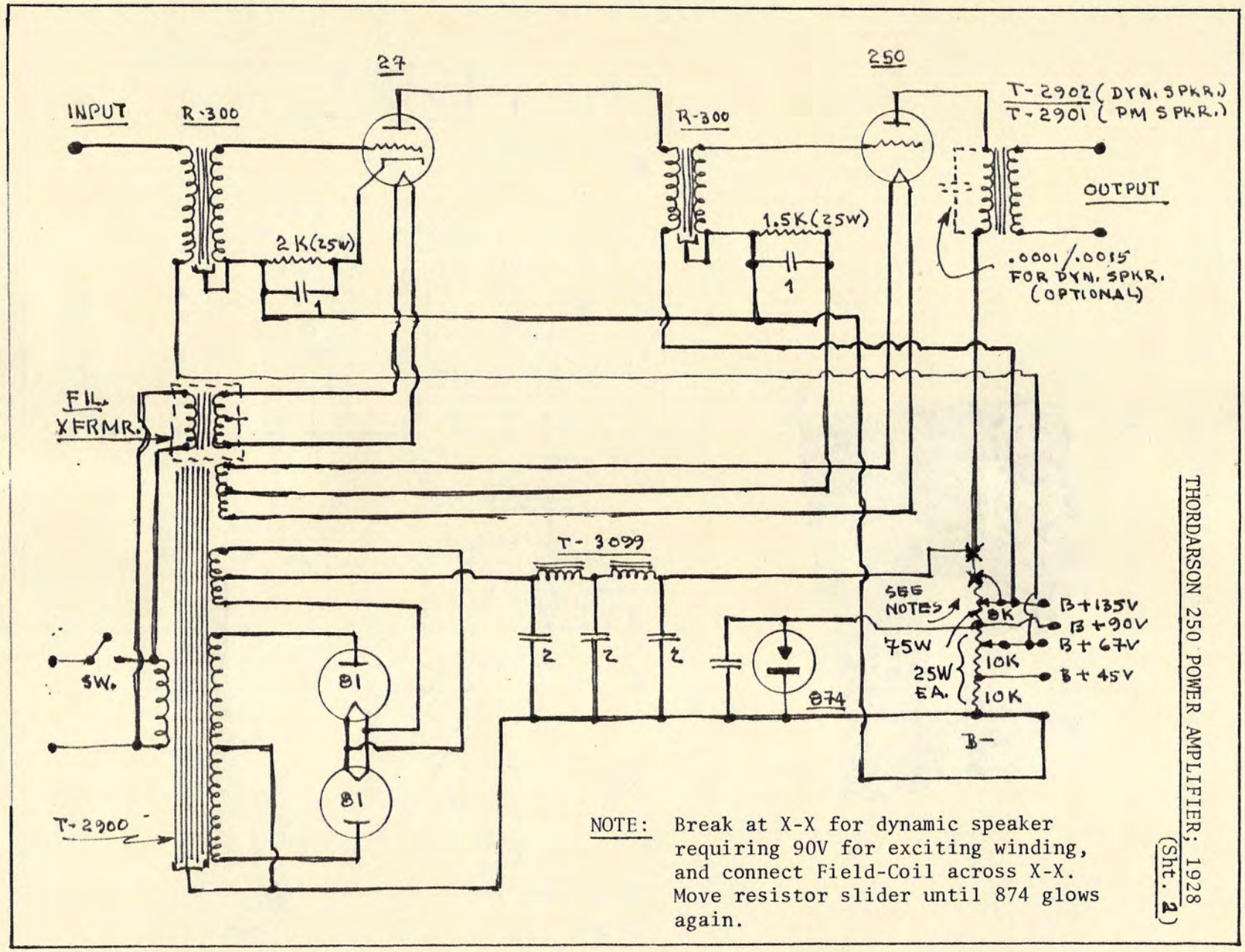


THORDARSON 250 POWER AMPLIFIER; 1928
(Sht. 1)





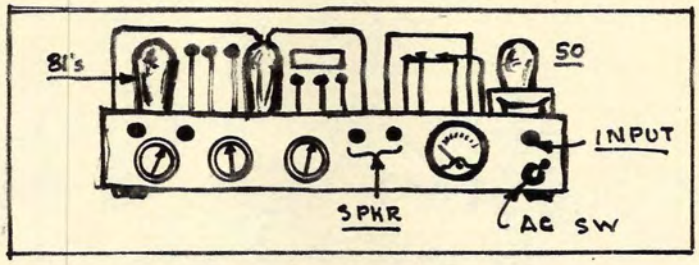
Z-Z = same as X-X Sht.2.

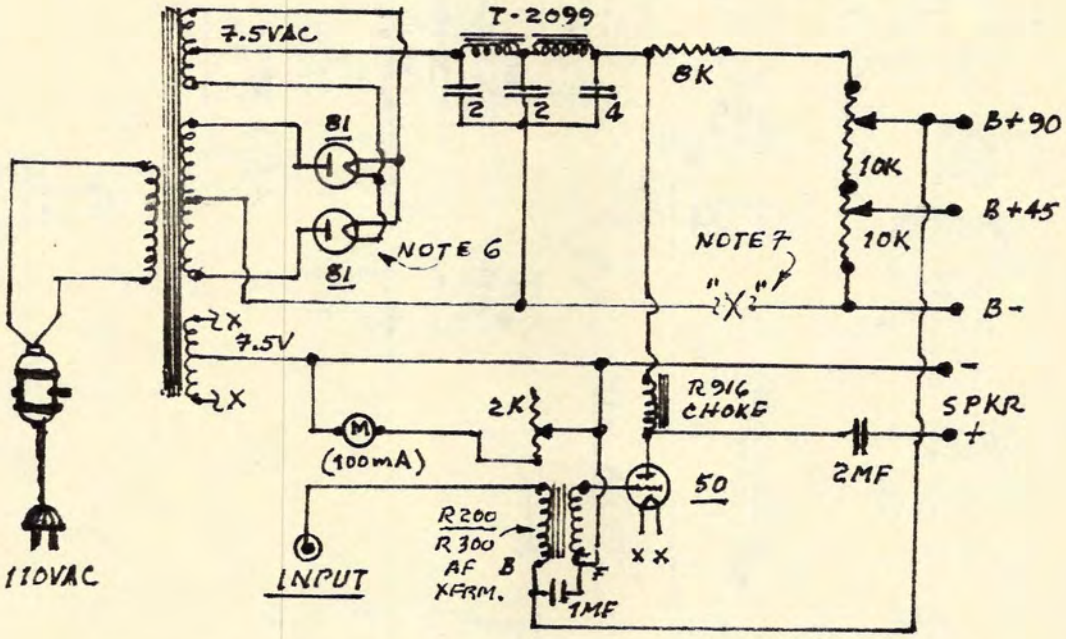


NOTE: Break at X-X for dynamic speaker requiring 90V for exciting winding, and connect Field-Coil across X-X. Move resistor slider until 874 glows again.

THORDARSON 250 POWER AMPLIFIER; 1928 (Sht. 2)

THORDARSON 350 POWER AMPLIFIER & "B"-SUPPLY - 1927

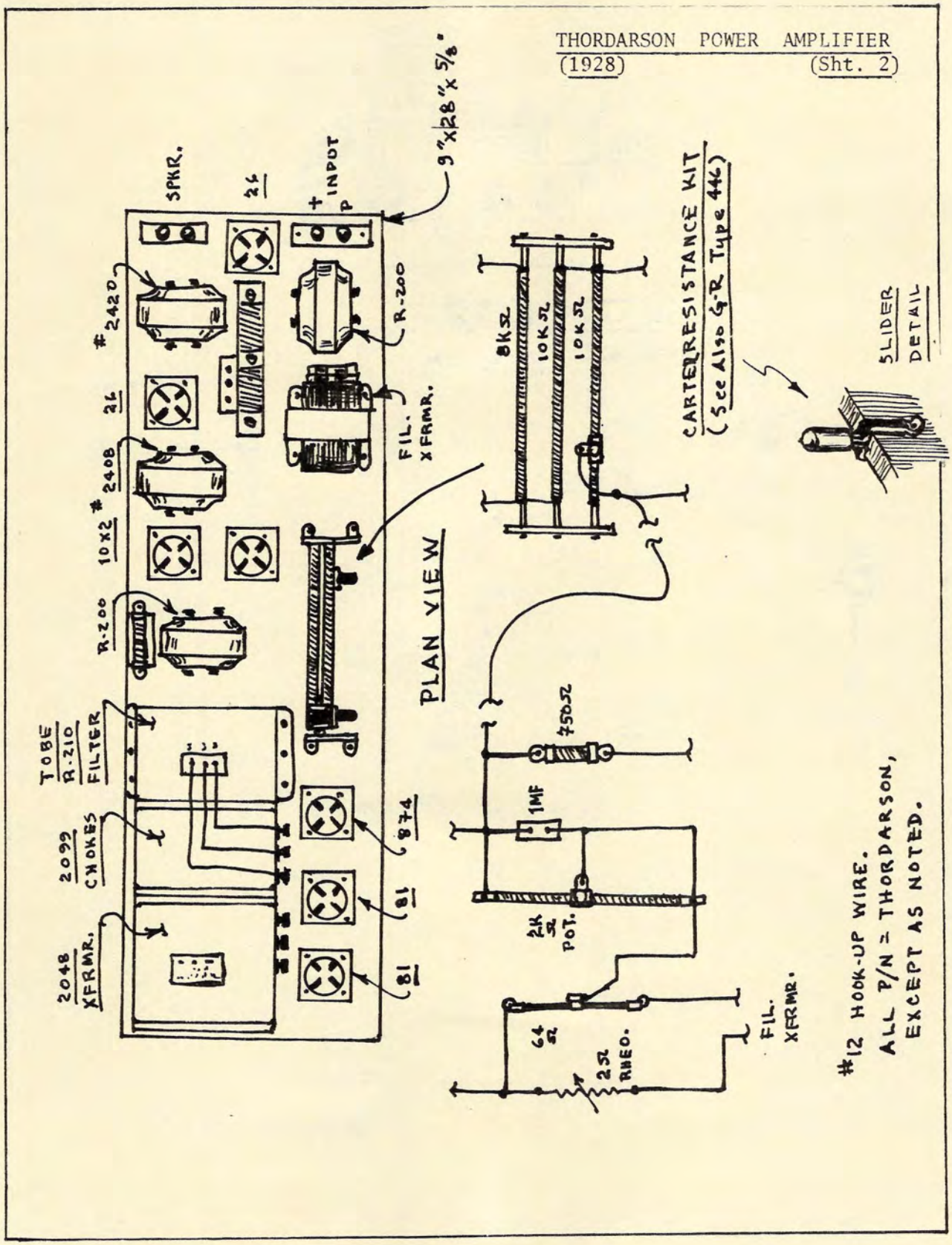


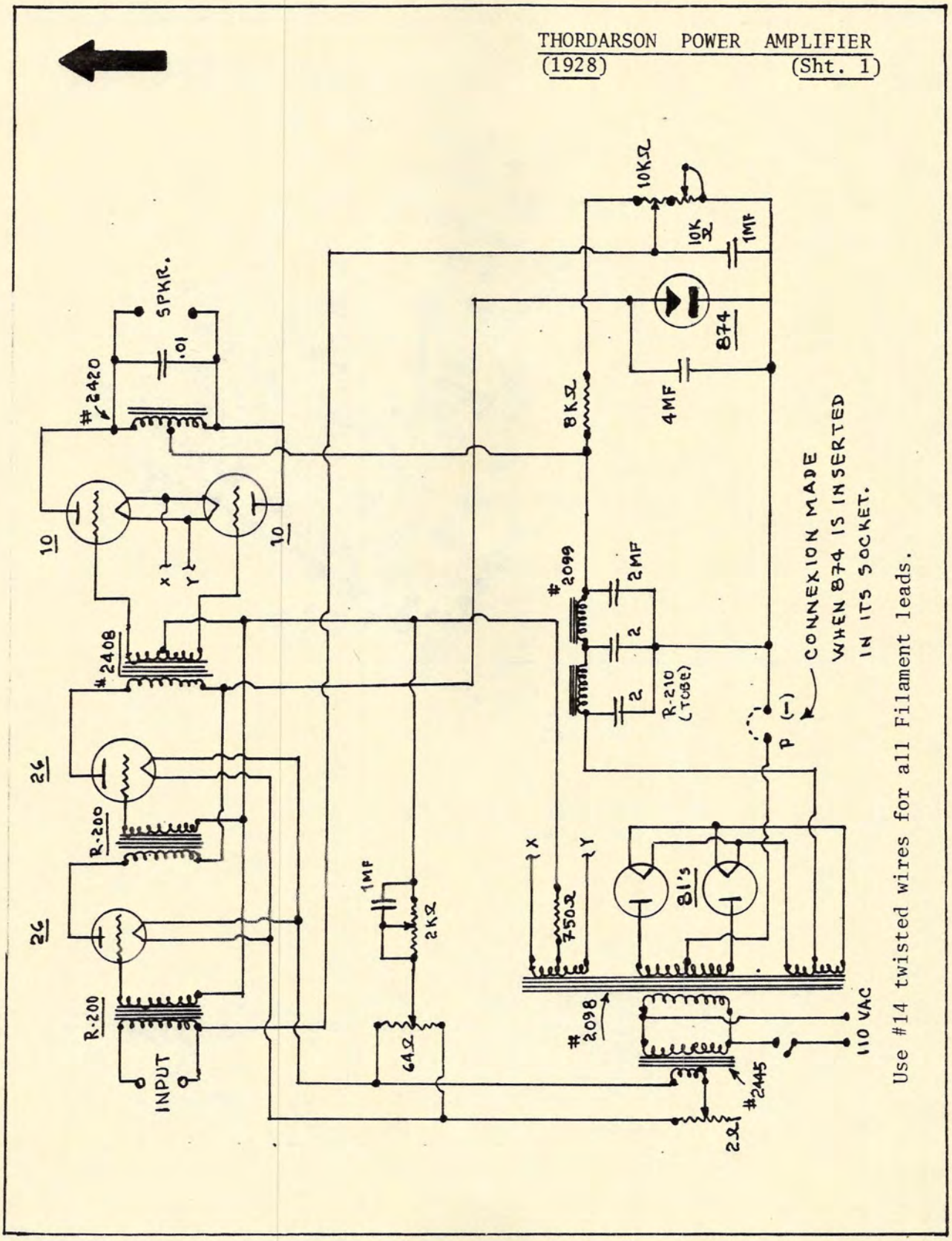


NOTE: Red TPs indicate short or defective condensers.

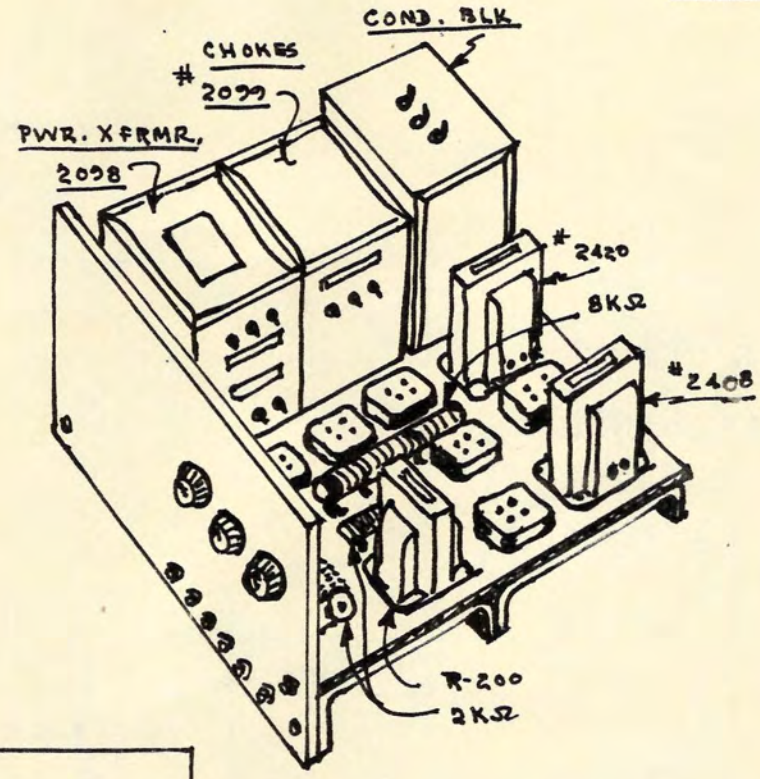
NOTES:

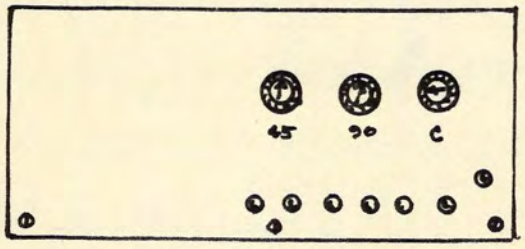
1. Panel = 3.5" x 12"
2. Baseboard = 10" x 12" x ½"
3. Jewell #135 mAmmeter
4. (6) Binding posts
5. Meter should be set at between 50 and 60 mA.
6. 81 plate should be a DULL red - not red.
7. —X— = If 4.5V "C"-bias is required for 1st stage, insert a 225-ohm resistor at "X".


THORDARSON POWER AMPLIFIER
(1928)
(Sht. 2)
9"x28"x 5/8"
SPKR.
26
+ INPUT P
#2420
R-200
26
FIL. XFRMR.
#2408
10X2
R-200
PLAN VIEW
TOBE R-210 FILTER
2099 CHOKES
2048 XFRMR.
874
81
81
8KΩ
10KΩ
10KΩ
CARTER RESISTANCE KIT
(See Also G-R Type 446)
SLIDER DETAIL
750Ω
1MF
2K Ω POT.
64 Ω
25Ω RHEO.
FIL. XFRMR.
#12 HOOK-UP WIRE.
ALL P/N = THORDARSON,
EXCEPT AS NOTED.


THORDARSON POWER AMPLIFIER
(1928)
(Sht. 1)
SPKR.
.01
#2420
10
10
X
Y
#2408
26
26
R-200
R-200
INPUT
1MF
2KΩ
64Ω
8KΩ
#2099
2MF
2
2
R-210 (TUBE)
10KΩ
10K Ω
1MF
874
4MF
CONNEXION MADE WHEN 874 IS INSERTED IN ITS SOCKET.
P (-)
X
Y
750Ω
81's
#2098
#2445
110 VAC
2Ω
Use #14 twisted wires for all Filament leads.

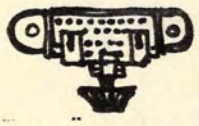
THORDARSON POWER AMPLIFIER, 1927
(Sht. 1)





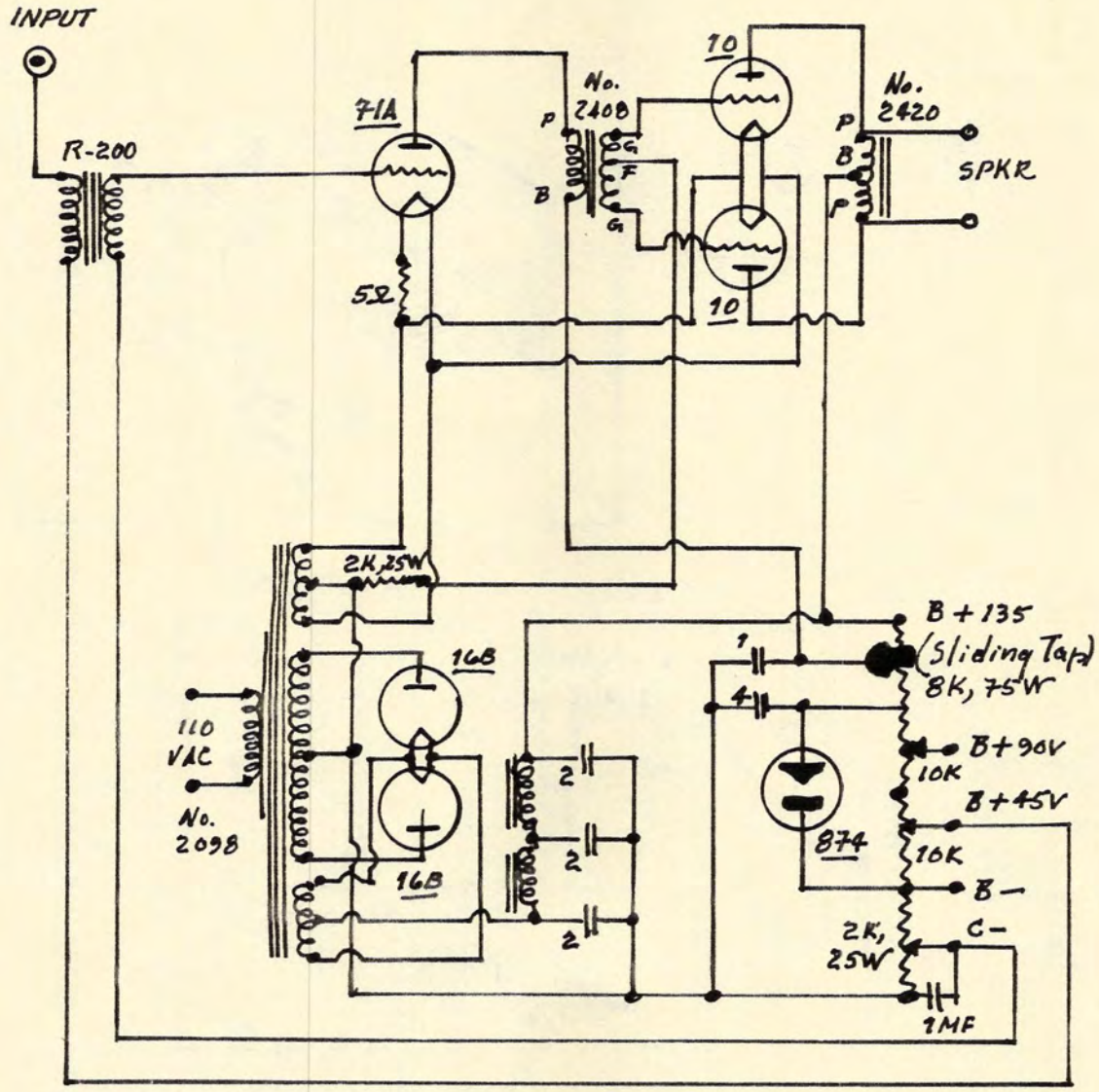
NOTES

1. Panel = 7" x 16" x .187".
2. Sub-Panel = 12" x 16" x ¼".
3. KARAS sub-panel brackets.
4. ELECTRAD Tubular Resistors.
5. AMERICAN #703 Cond. Blk.
6. Frost #703 sockets.
7. EBY binding-posts (7).



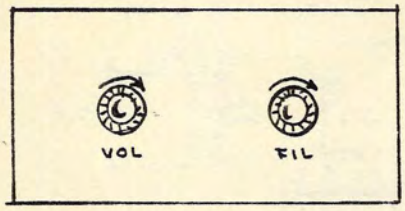
(2K, 25W)

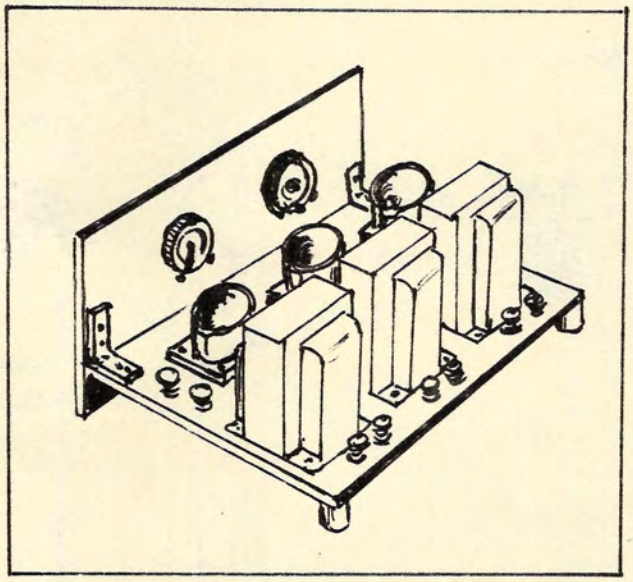
THORDARSON POWER AMPLIFIER, 1927
(Sht.2)

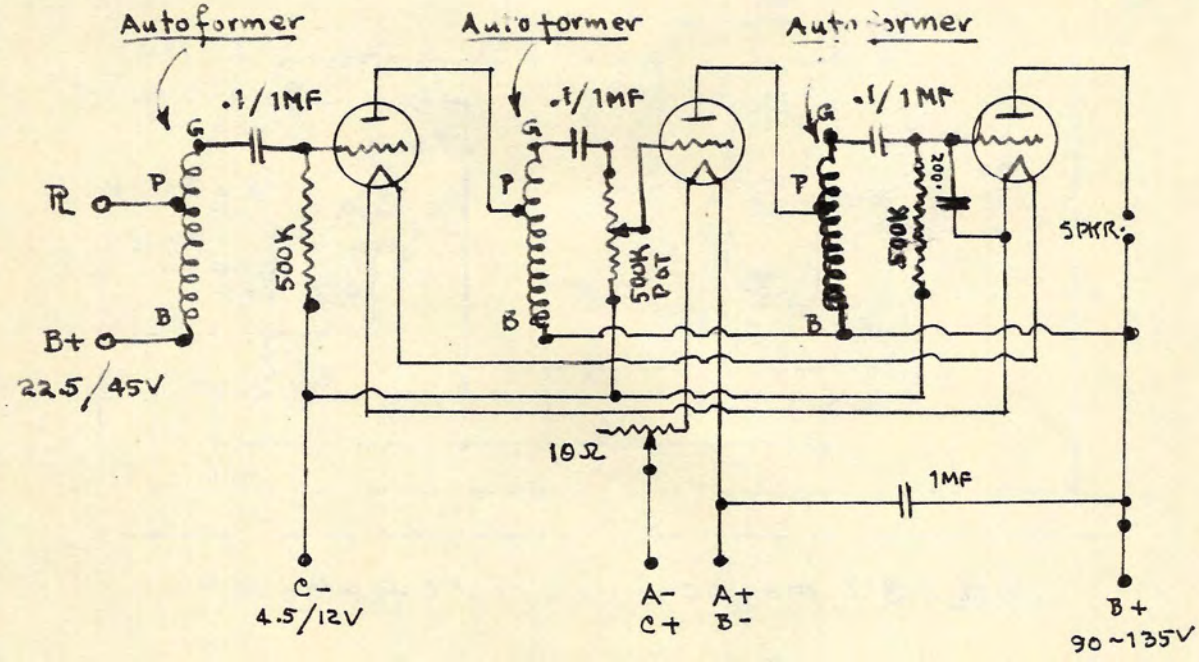


NOTE: 81's may be substituted for the 16B's.

THORDARSON "AUTOFORMER" AMPLIFIER, 1926

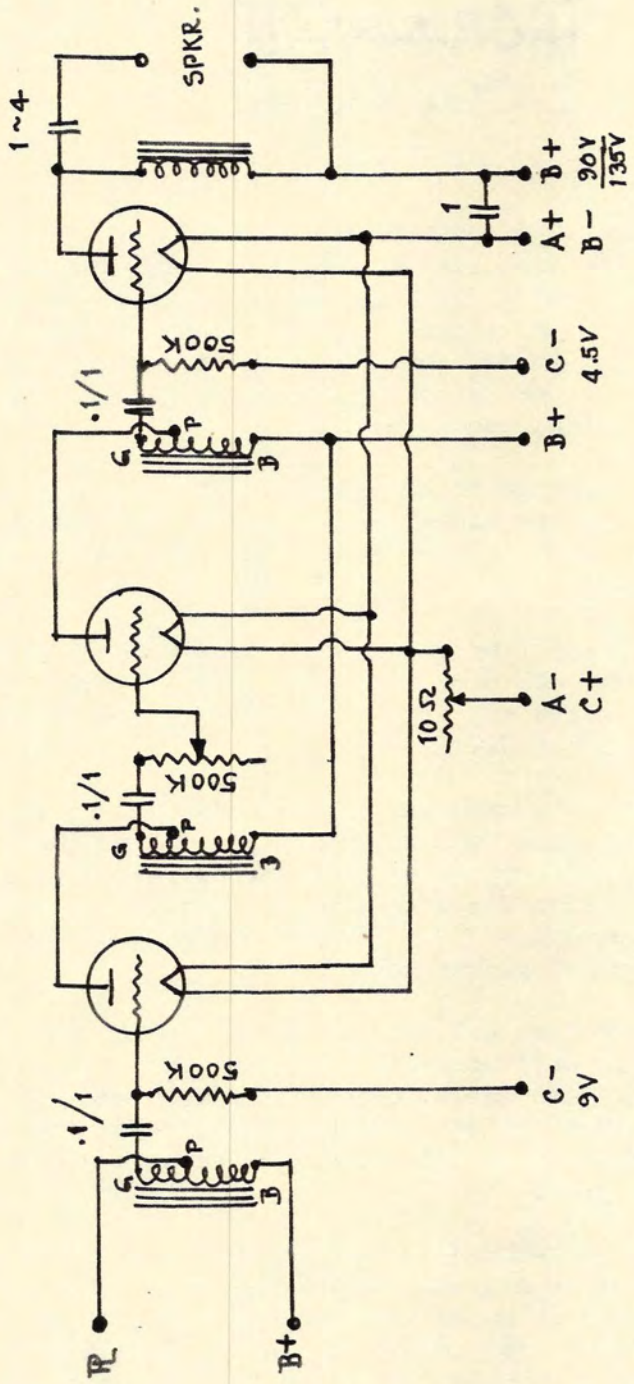






(CB Spr. 26)

THORDARSON AUTOFORMER AF AMPLIFIER, 1927
(Variant)



(RN 11·27)

THORDARSON
Z-COUPLER

The THORDARSON Z-Coupler was, in a very real sense, a sophisticated gadget. Its only function was to replace the second AF transformer in a conventional transformer coupled audio stage, and to make use of the 22 screen-grid tube, then in a rather editorially hysterical ascendency.

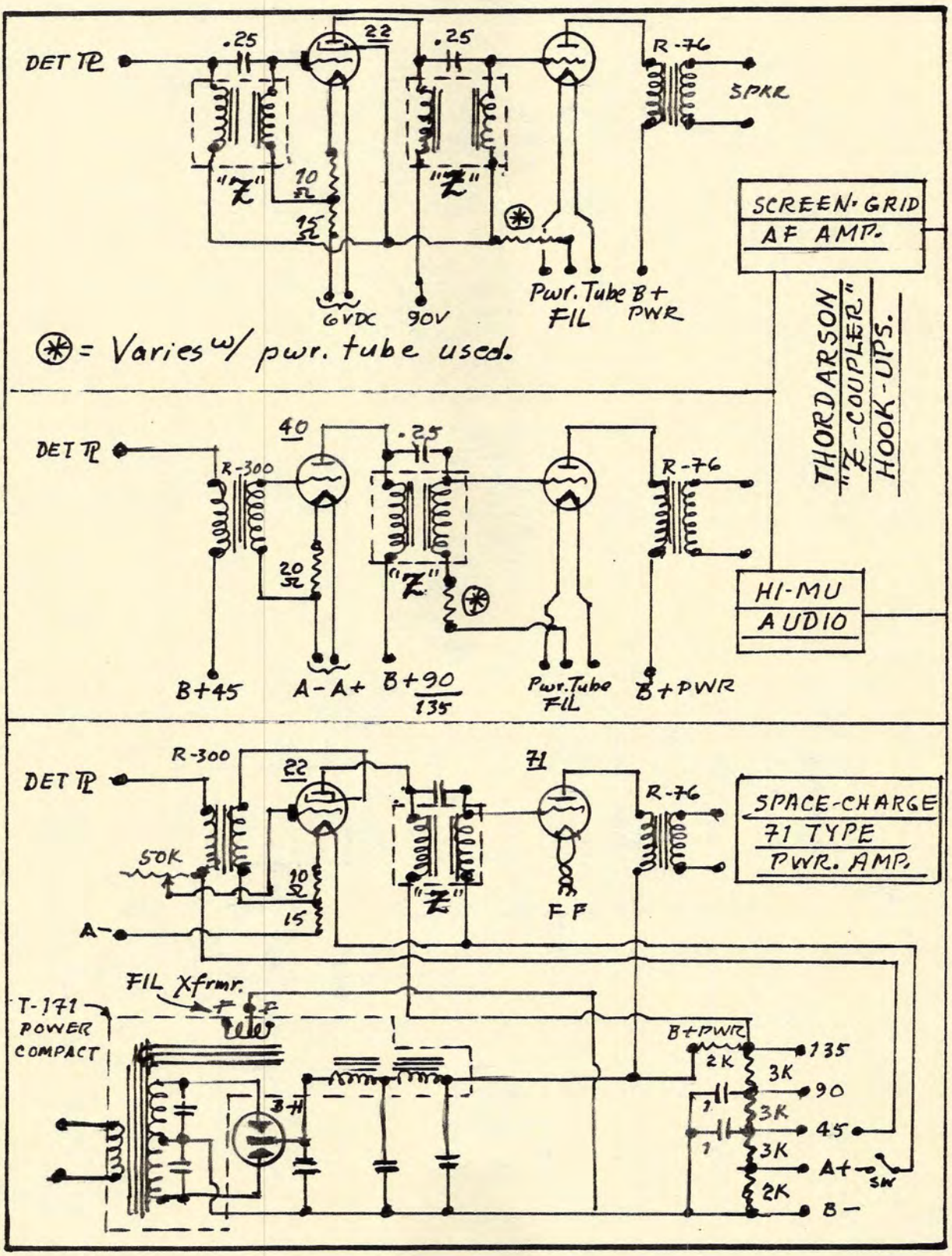
The Z-Coupler consisted of two exceedingly high impedances (coils) , each coil wound on individual forms. One coil had been designed to match the plate impedance of the 22 tube; the other being designed for use in the grid circuit of the following tube.

Its chief virtue was simply that one stage of Z-coupled AF had an amplification of from 40 to 50 times the input voltage. Tonal fidelity was not affected, from high to low notes. The unit weighed nearly four pounds, and sold for $12.

The 22 tube, you may remember, was RCA's answer to the invention of the first screen-grid tube by the English firm, 1926. The THORDARSON Z-Coupler can be incorporated into any conventional two-stage transformer-coupled audio circuit, with the prerequisite parts as depi cted on the following page. The incorporation is easily accomplished, requiring about thirty minutes.

Does it make a difference? Yes, quite a bit, but you will find that it does not do as well with any other screen-grid tube. A use for the Z-Coupler that came later, after the enthusiasm for the 22 tube began to subside, was its use in power amplifiers, combined with a conventional B-eliminator - a diagram for one such will also be found on the following page.

If you have a THORDARSON Z-Coupler at hand and an old set with two stages of transformer coupled AF, you may find it worth an hour or so, just to see what it would do; also assuming, of course, you also have a good 22 tube. Speaking of which: you will find that the 22 valves manufactured by Marconi of Canada were superior.

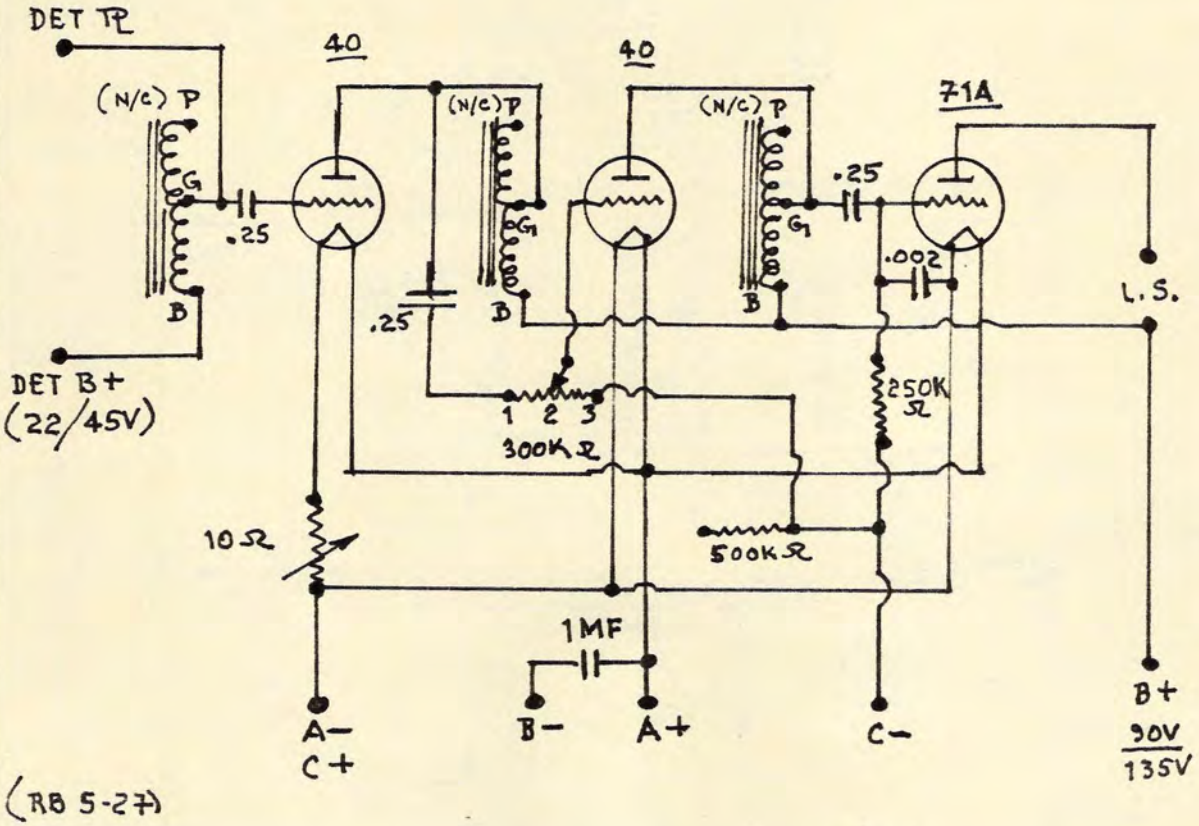

DET TP
.25
22
.25
R-76
SPKR
"Z"
10 Ω
15 Ω
"Z"
6VDC
90V
Pwr. Tube FIL
B+ PWR
SCREEN-GRID AF AMP.
⊛ = Varies w/ pwr. tube used.
THORDARSON "Z"-COUPLER HOOK-UPS.
DET TP
40
.25
R-300
R-76
20 Ω
"Z"
HI-MU AUDIO
B+45
A-A+
B+90
135
Pwr. Tube FIL
B+PWR
DET TP
R-300
22
71
R-76
SPACE-CHARGE 71 TYPE PWR. AMP.
50K
10 Ω
15
"Z"
FF
A-
FIL Xfrmr.
T-171 POWER COMPACT
B+PWR
2K
3K
3K
3K
2K
135
90
45
A+
SW
B-

THORDARSON "ALL FREQUENCY" AMPLIFIER '27

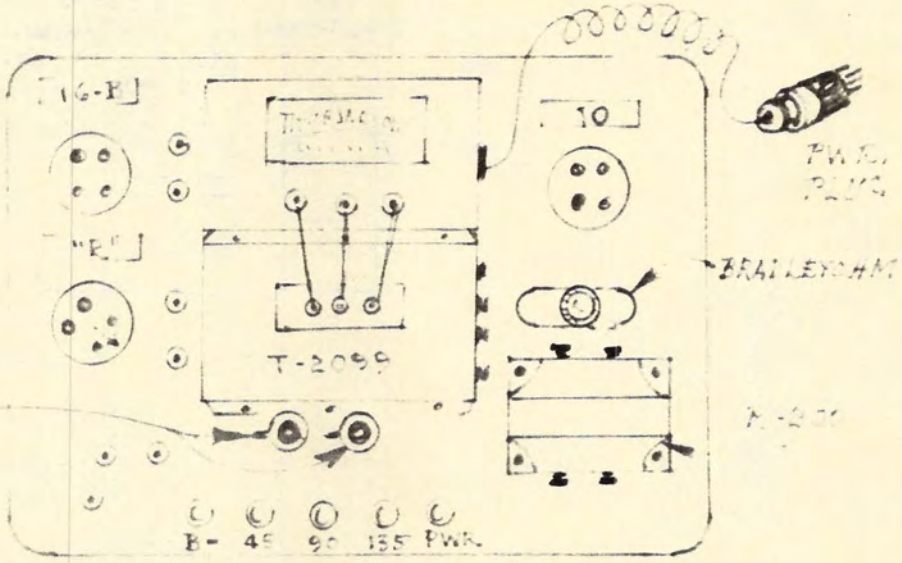
As would have been expected, there were many "me-too" type circuits concocted during the Twenties, with some working reasonably well, and others simply oportunism personified. The circuit below, however, has always been puzzling, in as much as it seems so unnecessary, in terms of what it was designed to do. It is reasonable to assume that the THORDARSON people simply concocted it to dramatise and sell their new "Autoformer" of that year.

There were concurrently other AF amplifiers better designed and with better performance. You will note that the "P" terminal of each "Autoformer" is not connected - a wasted winding, and adding to the cost of the units, which was $5: and that the open-ended resistor makes one wonder.

The unit works quite well with most any TRF, but not so well with reflexes, crystal detectors, 3-circuit tuners. Still, if you have the THORDARSON units at hand, you might care to construct this amplifier, preferably on a bread-board, to add to your edification of what the early set-constructors experienced.

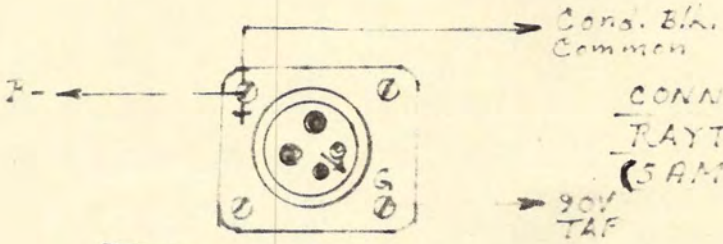


THORDARSON TYPE 210 POWER SUPPLY, 1927

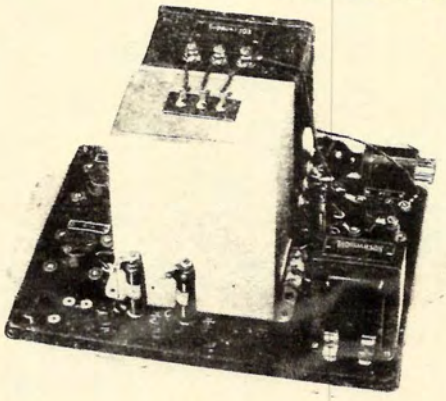


210 TYPE, 1927

Same steel base & porcelain terminals as used for the 211 model.



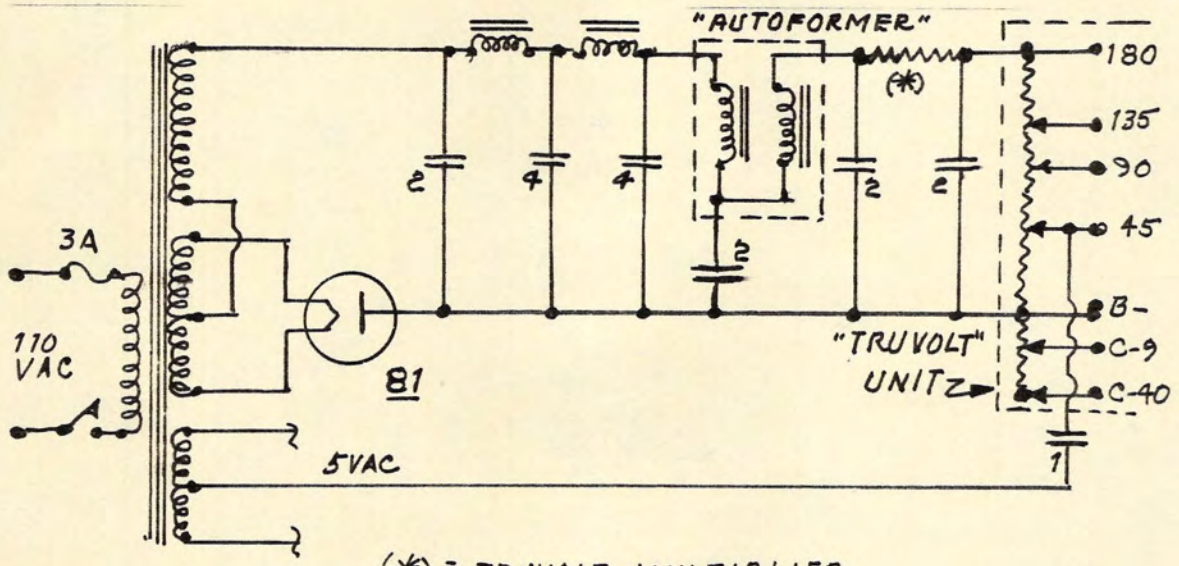
CONNEXIONS FOR THE RAYTHEON "R" TUBE. (SAME AS THE 874)



NOTE:

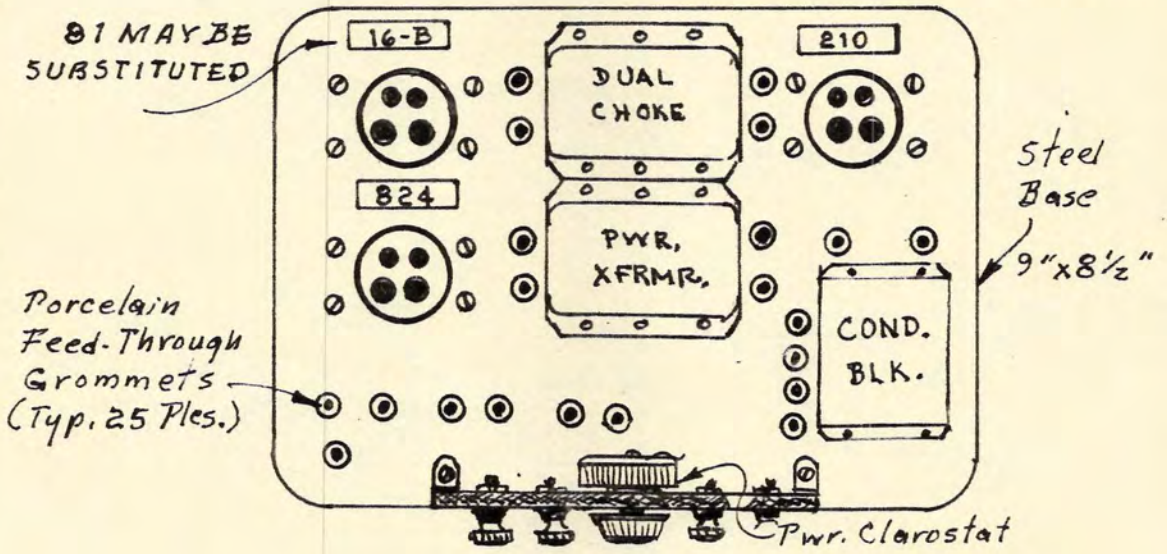
An 81 may be substituted for the 16-B rectifier. The 81 is a bit more durable.

THORDARSON POWER UNIT USING THE 1927 ELECTRAD "TRUVOLT" VOLTAGE DIVIDER

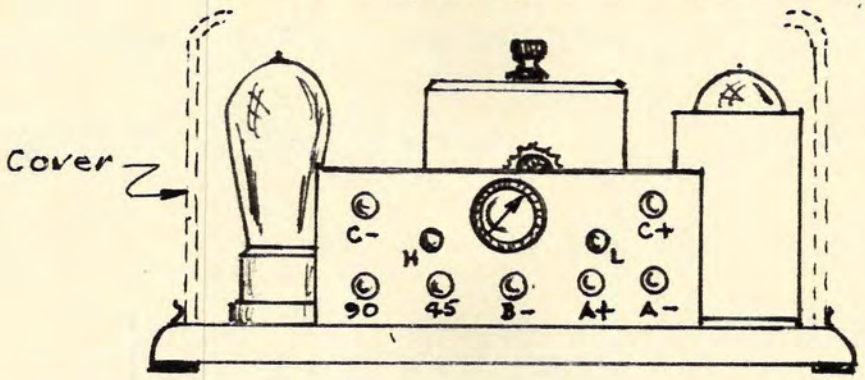


(*) = TRUVOLT MULTIPLIER
THORDARSON R-196 FILTER CHOKES.
THORDARSON T-210 TRANSFORMER.

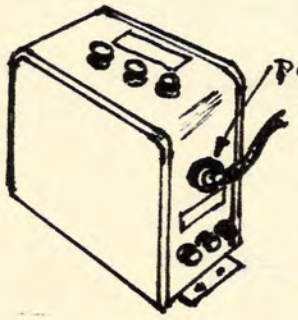
THORDARSON R-211 POWER COMPACT, '27



PLAN ~ COVER REMOVED



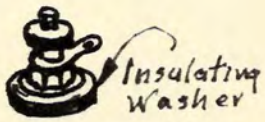
ELEVATION ~ COVER REMOVED



T-2098 PWR. XFRMR.

425V 130mA ($20)

T-2099 DUAL CHOKE, 30H, SAME CONFIGURATION ($14)

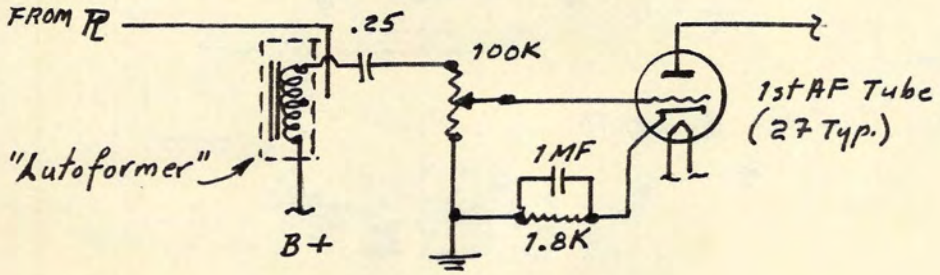


TYPICAL BINDING POST

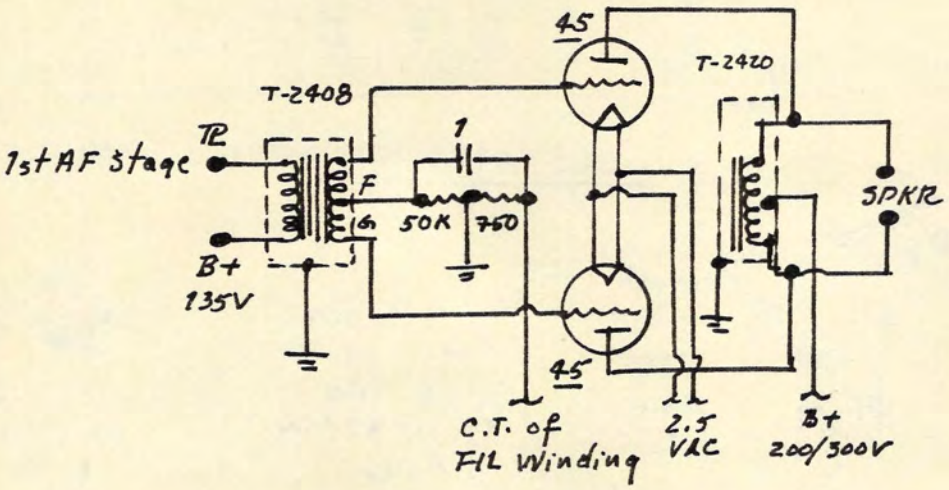
(See Also R-210)

THORDARSON "AUTOFORMER" HOOK-UP

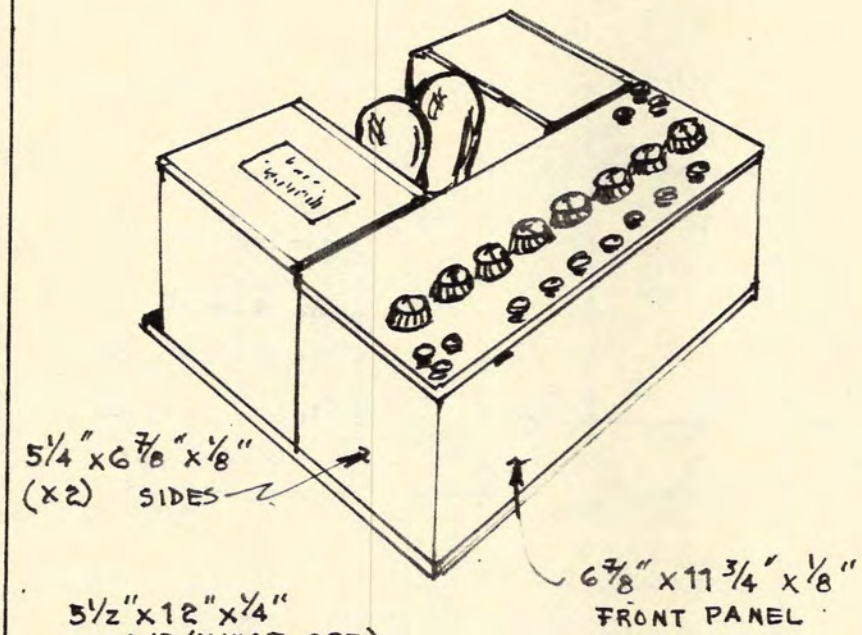
Instead of coupling the DET output through a regular transformer to the 1st AF tube, the following may be utilised:

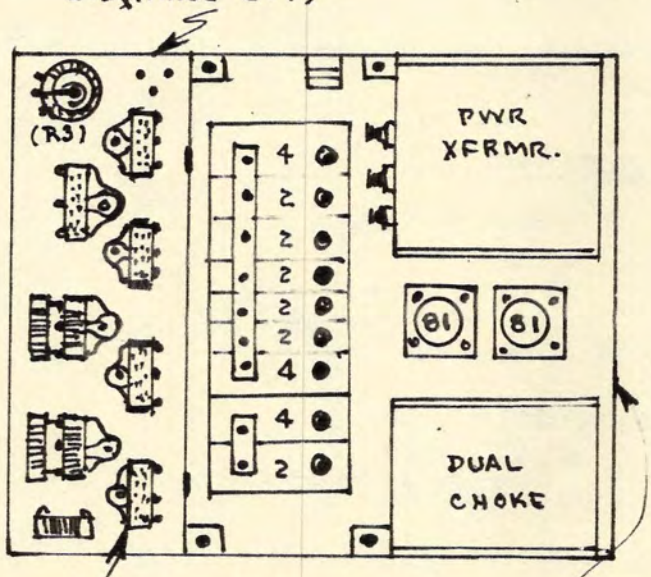


THORDARSON T-2408 XFRMR HOOK-UP; P-P



THORDARSON B-SUPPLY, 1928:Sht.1



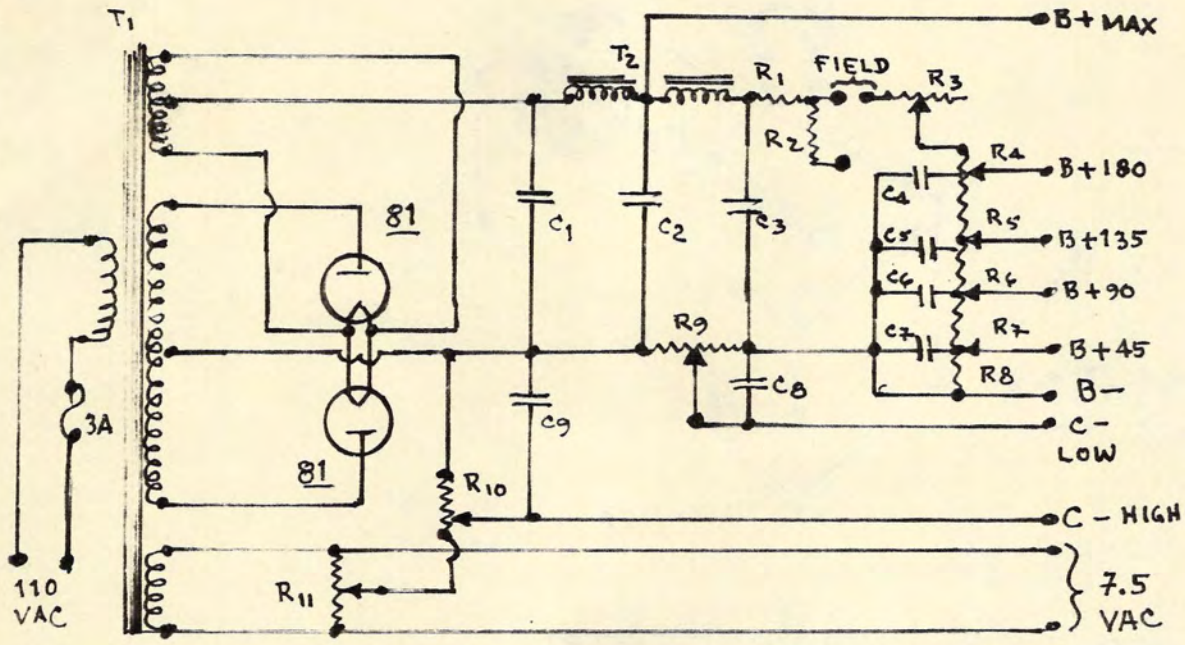


THORDARSON UNITS:
T2950 Power Xfrmr.
3100 Dual Choke

ELECTRAD "TRUVOLT" UNITS:
2K (B20) x 2
4K (T40) - Variable
1.5K (T15)
1K (T10) x 4
400-ohms (T4)
500-ohms (B-5
200-ohm Pot.)Carter)

(RW-11-10-28)

THORDARSON B-SUPPLY, 1928: Sht. 2

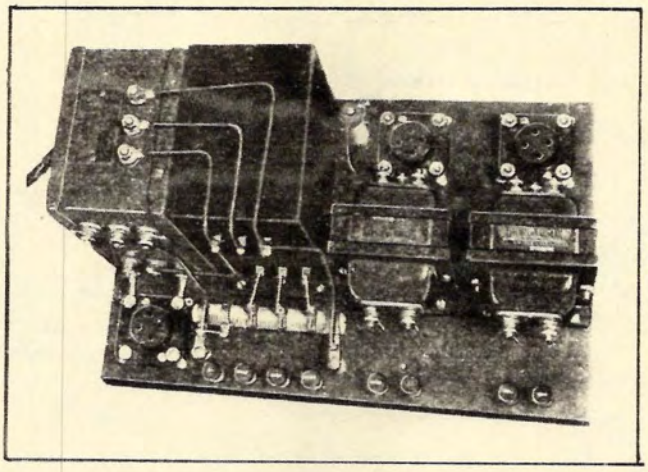


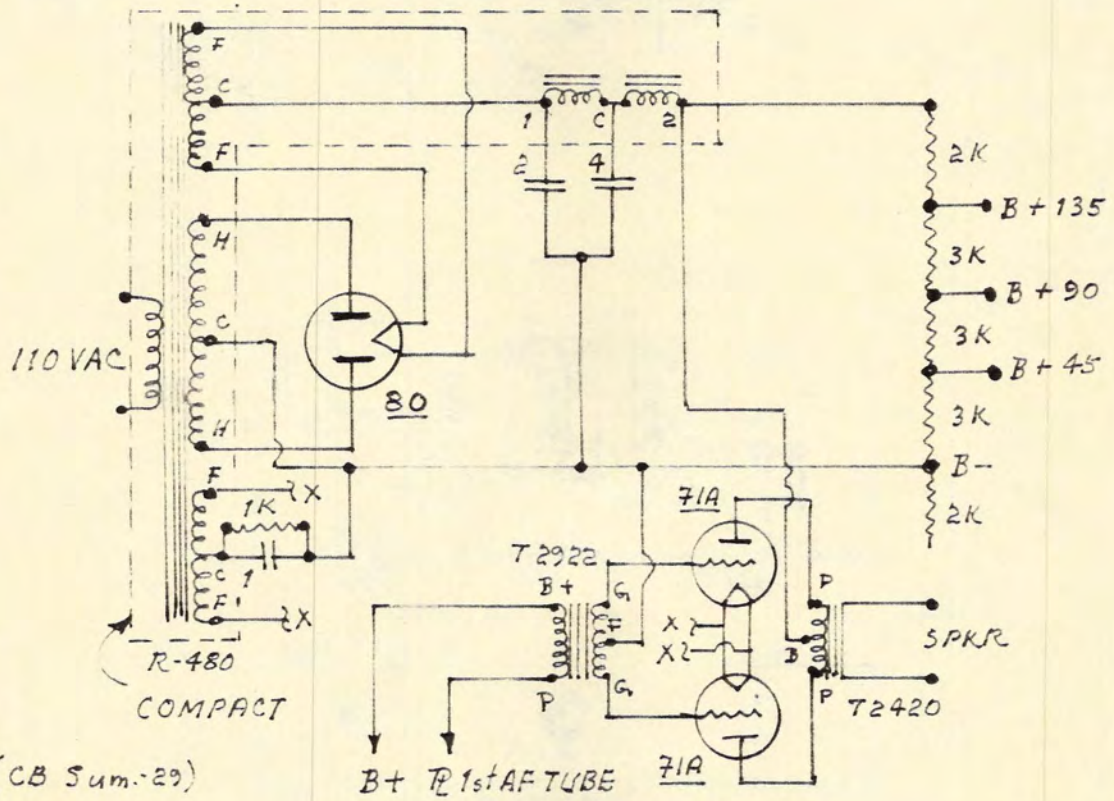
PARTS LIST

Electrad Items:	Paravolt Items:
R1,R2 = 2K	C1 = 2MF, 1KV
R3 = 4K	C2, C3 = 4MF, 600V
R4 = 1.5K	C4 thru C8 = 2MF, 200V
R5, R6, R7, R10 = 1K	C9 = 4MF, 200V
R8 = 500Ω	
R9 = 400Ω	
R11 = 200 Pot. (Carter)	T1 = T-2950
13 Binding Posts	T2 = 3100
2 Sockets	Panels as shown.

(RW 11-10-28)

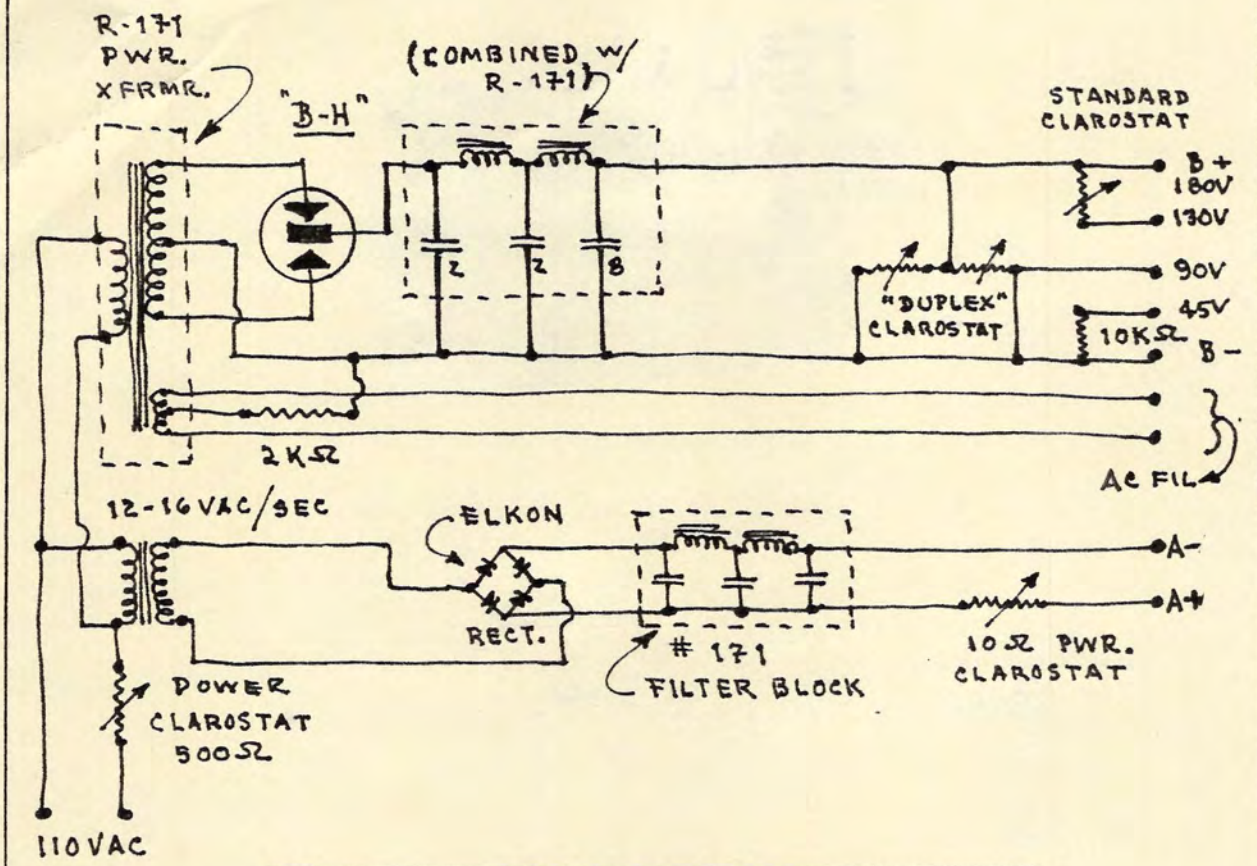
THORDARSON R-480 POWER AMPLIFIER,'29

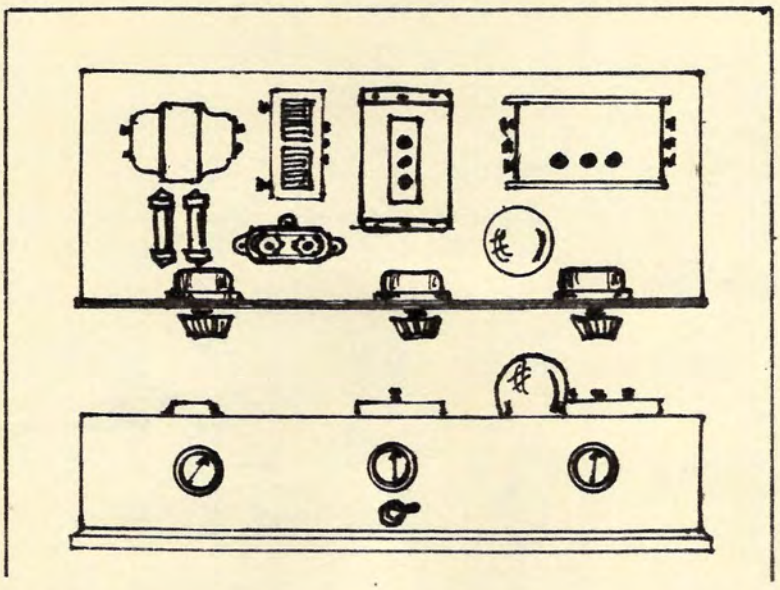


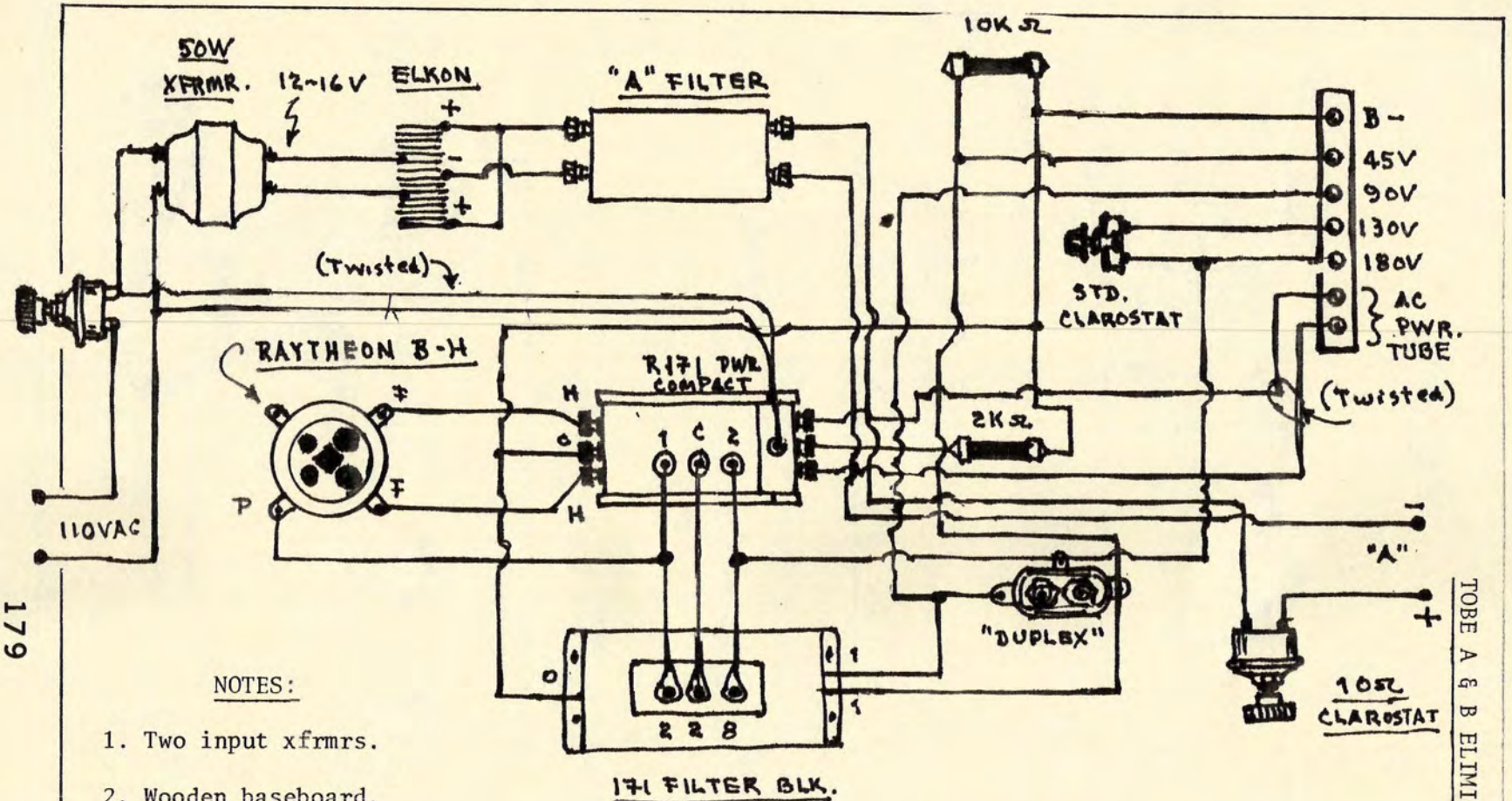


TOBE "A & B" BATTERY ELIMINATOR, 1928

(Sht. 1)





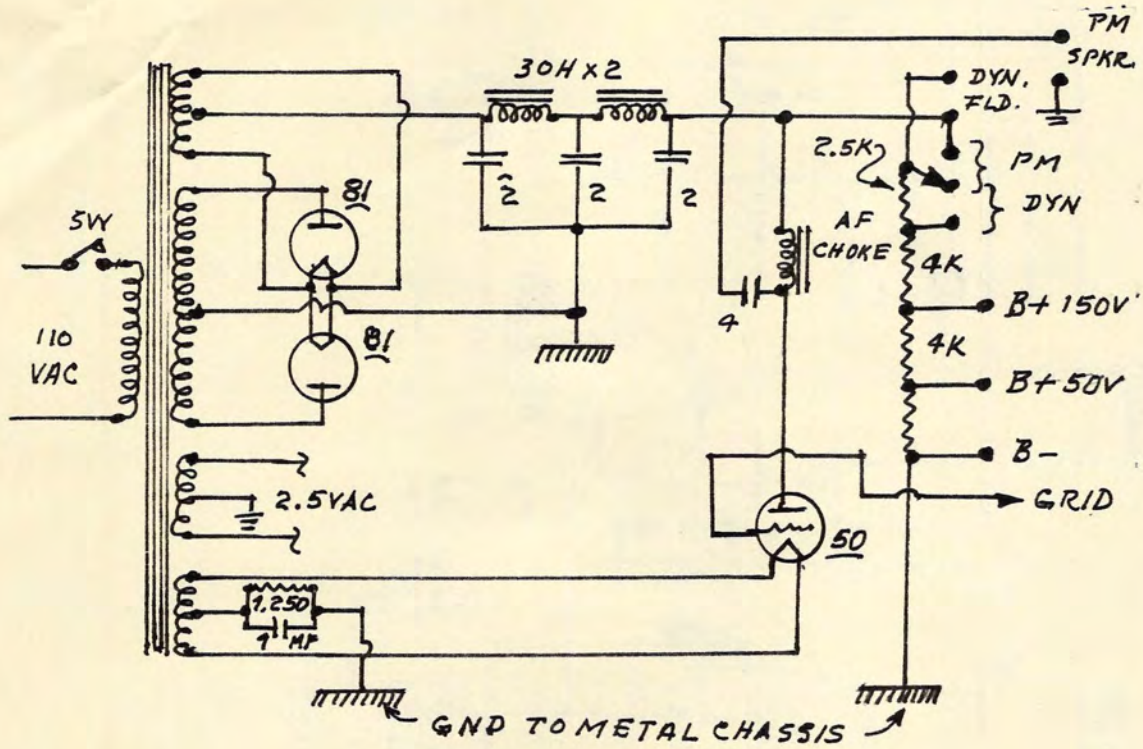


NOTES:

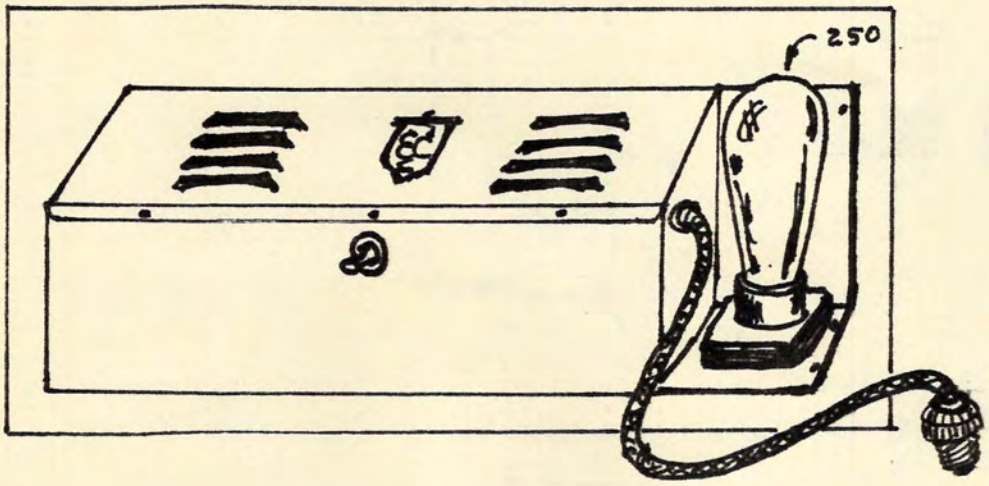
1. Two input xfrmrs.
2. Wooden baseboard.
3. 1-C2 = Choke terminals.
4. Rectifier mounted on top of "A" transformer.
5. (9) Binding posts
6. Three-digit numbers are TOBE part numbers.

TOBE A & B ELIMINATOR, 1928; Sht. 2

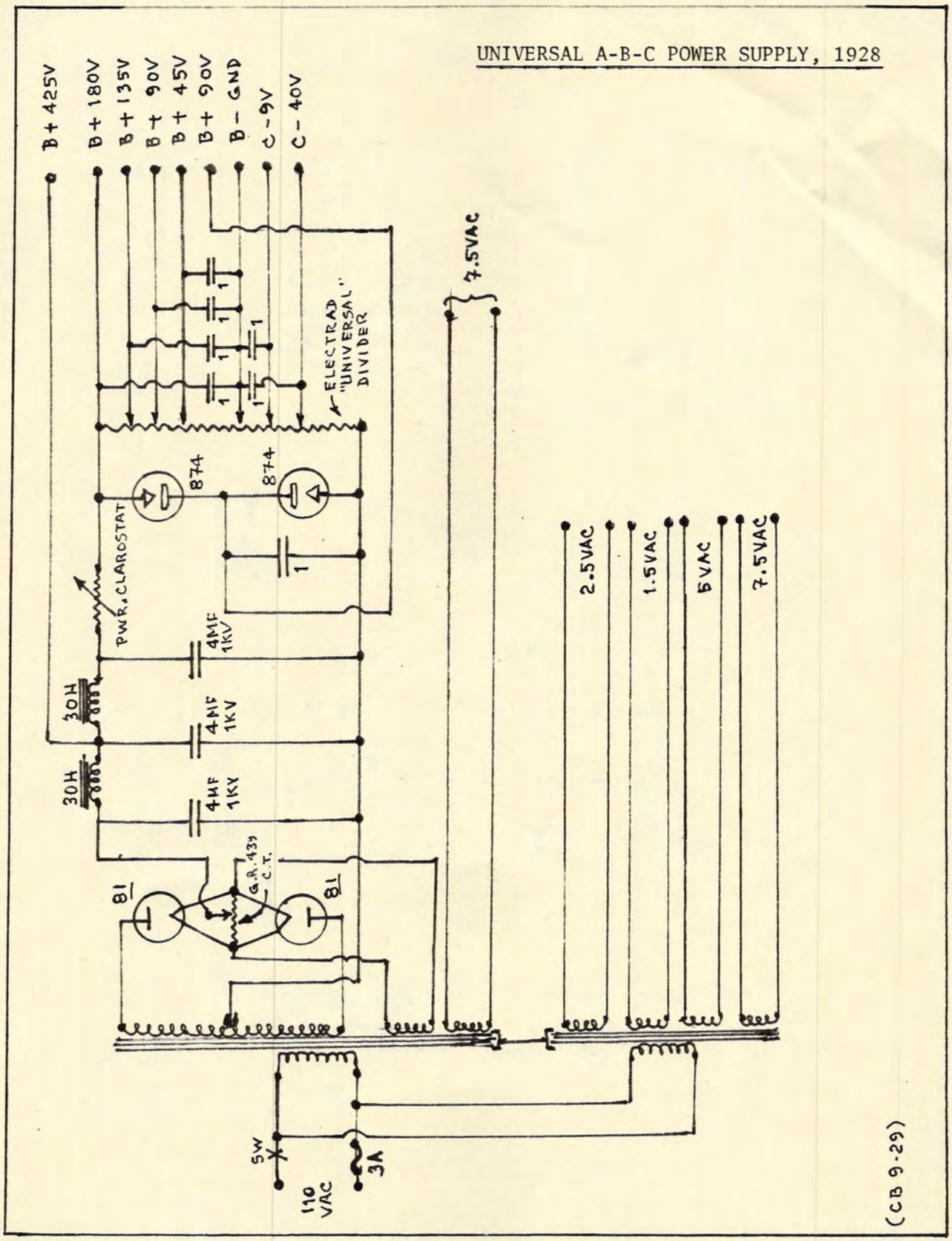
TYRMAN "IMPERIAL 80" POWER SUPPLY
(1928)



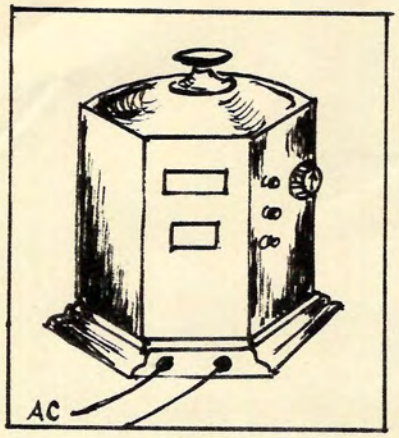
GND. TO CHASSIS (METAL).



UNIVERSAL A-B-C POWER SUPPLY, 1928

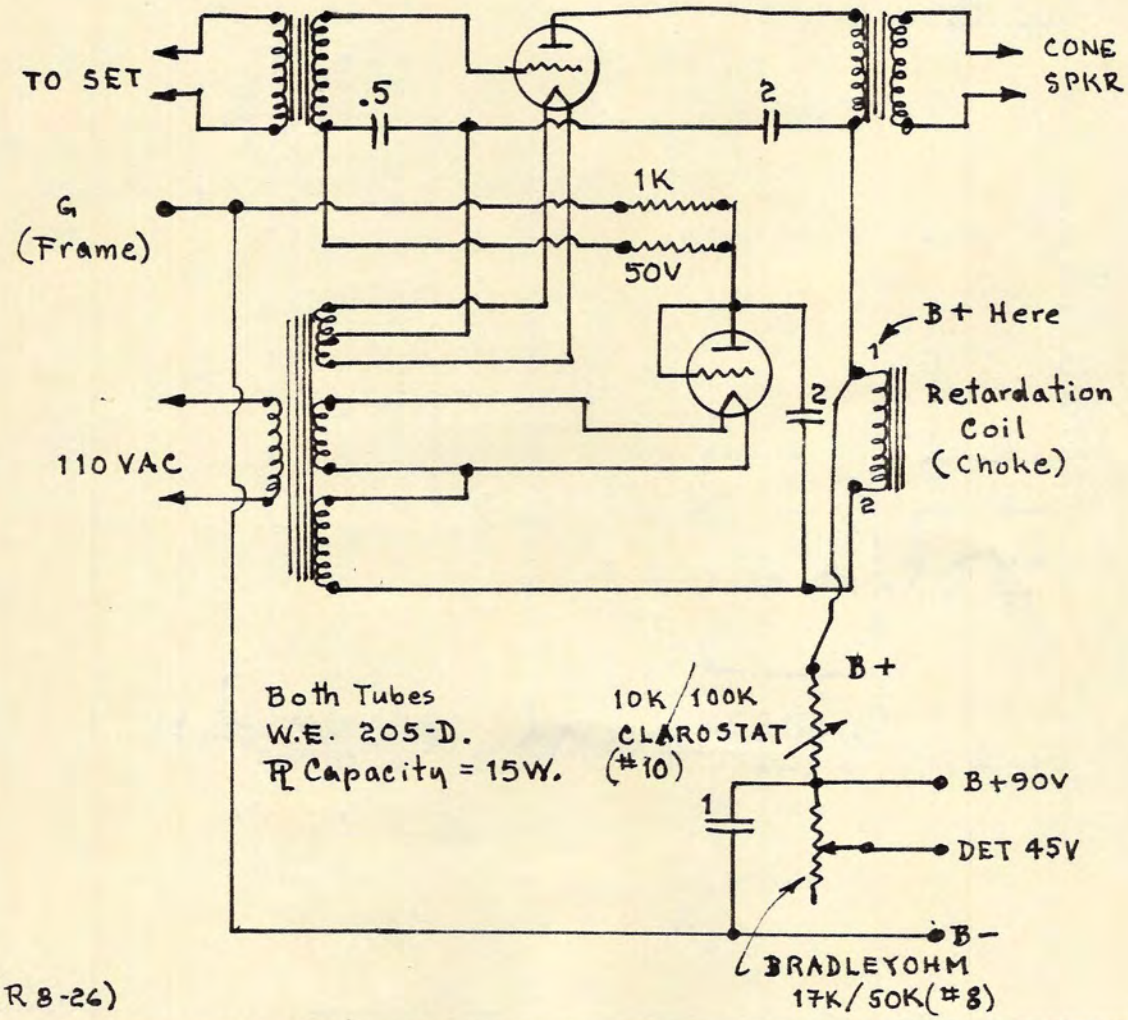


WESTERN ELECTRIC 205-D AMPLIFIER, 1927



W.E 205-D TUBES

FIL Voltage	=	4.4V
FIL Current	=	1.6A
PLATE Voltage	=	350V
PLATE Current	=	25 mA
GRID Voltage	=	25
IMPEDANCE	=	3K/4.5K
AMPLIFICATION	=	7
OUTPUT	=	5W



(R 8-26)

Beyond Rider!

SEE BACK COVER

As relevant adjuncts to this work by D.H.MOORE, your attention is directed to other works listed over-leaf. Additional information may be gotten from the publishers, or by sending a stamped and self-addressed envelope to either of the companies listed below. An immediate reply will be forth-coming.

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Vol. IIB - Broadcast Receivers, M-Z
Vol. III - Short-Wave Receivers
Vol. IV - Power Supplies & Amplifiers
Vol. V - Hardware & Accessories
Vol. VI - Early Test Equipment
Vol. VII - General Technical Data
Vol.VIII - The Early Years: 1910-1925
Vol. IX - Supplemental Data

SEPÈRATE MONOGRAPHS:

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REMLER/BEST	*STROBODYNE*	*BROWNING-DRAKE*
SCOTT (Early)	*BREMER-TULLY*	*NATIONAL/HAMMARLUND*
INFRADYNE	*DOERLE*	*SARGENT-RAYMENT*
	THE MYSTERIOUS REFLEX	

Other Monographs are in preparation, and will be announced as published.

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TROPODYNE	VICTOREEN "Universal"
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COUNTERPHASE 6	PERIFLEX
BROWNING-DRAKE	HAMMARLUND-ROBERTS
SARGENT 8-34	CONSRAD PORTABLE, etc.

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